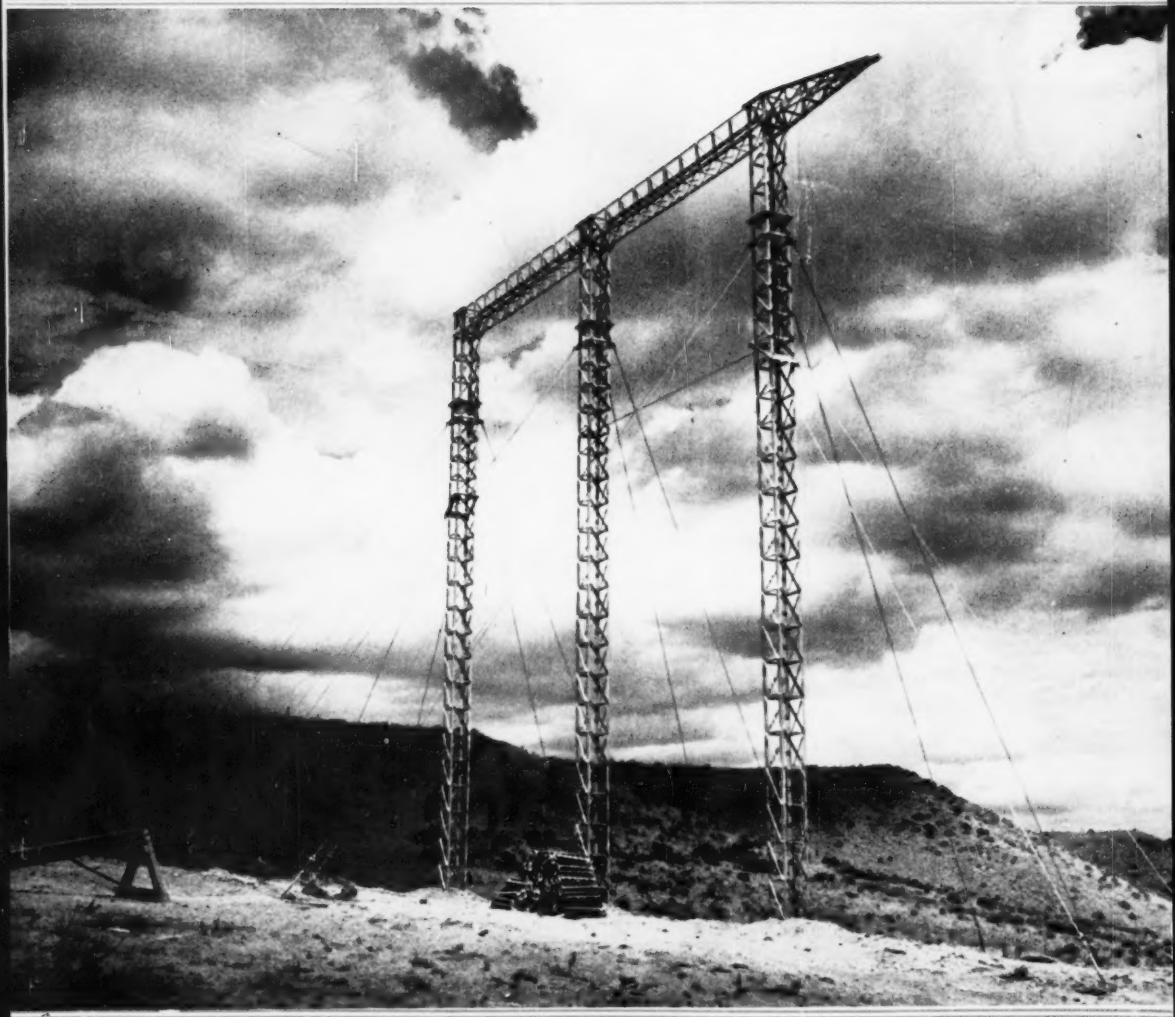
ELECTRICAL WEST

November 1949
25 cents



More Water in the West, Page 63
Appliances, Page 81

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

try for two!

Add the electric range and electric water heater to the list of go-well-togethers. Part of the reason for the combination's popularity is a series of Edison advertisements which tells your customers that it's best to have them both.

From the customers' point of view, there are very definite advantages. Besides putting efficient, dependable electricity to work in two of their homes' most important activities, it brings them the benefit of a special low electric rate which means added economy.

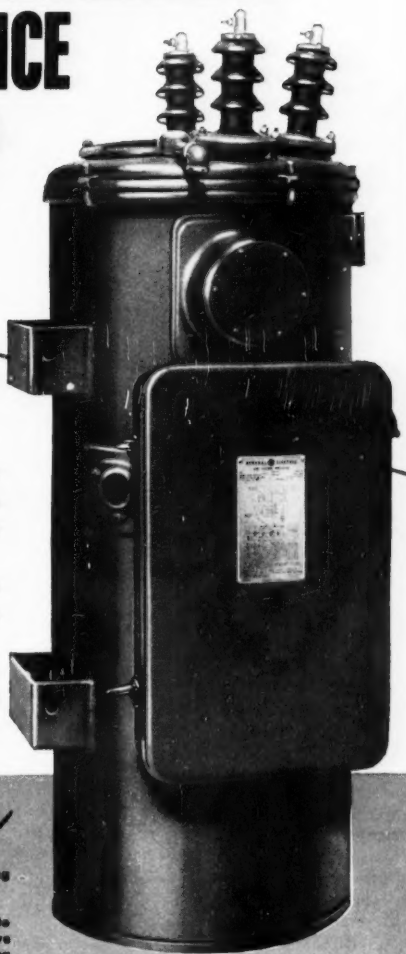
For the electrical appliance dealer, advertisements like these point the way to more prospects and extra sales, by emphasizing that it takes *two* to get *all* the advantages. Every customer with one is a prospect for the other. Customers who have neither—well, two *sales* are better than one, too!

SOUTHERN CALIFORNIA EDISON COMPANY

NOW

AN 8-STEP REGULATOR FOR THE PRICE OF A 4-STEP

General Electric's New ML8



This is General Electric's new ML8 Step Voltage Regulator. It supersedes the 4-step ML4—at no increase in price. It provides 10% automatic voltage regulation, in eight 1¼% steps—which means better service on rural feeders.

Closer regulation, smaller steps, increased capacity, widens the field of application to urban fringe areas at low installed cost and with minimum maintenance.

Booklet GEA-5417, just off the press, gives full information. Ask your local G-E office for a copy, or write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

Better Construction than ever before!

The stepless, snap-action Geneva gear drive—similar to the time-tested type ML4—assures accurate, positive positioning of contacts in the ML8. It has an improved switching circuit, employing the same bridging reactor principle as used for tap changing under load on large power transformers. The need of lubrication is eliminated because the complete switching mechanism, including the operating motor, is oil-immersed.

Control cabinet is now identical to that used with the more expensive IR5 induction regulator, including shelf which locks door open while providing a handy place for portable instruments. Cabinet may be mounted separately if desired.

GENERAL ELECTRIC

With Factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Rialto, and Sales Offices in twenty Western cities

NOVEMBER 1949

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
James H. McGraw, Jr., Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — R. A. Balzari, Publishing Counselor
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COVER PHOTO: 230 kv. light steel tower. Bonneville Power Administration.

Next Month

A feature for the December issue will show pictorially how mass production wiring methods were applied to electrical work on the multi-million dollar Metropolitan housing project, now under construction in Los Angeles. Some valuable lessons are to be learned that may have application to much smaller jobs. Another interesting development is the new ABC television center in Hollywood. Conversion of an old motion picture studio to the needs of television indicate that the movie industry and TV are very much attuned in production requirements.

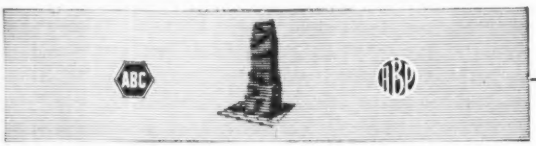
How a specific utility communication problem was solved will be told in an engineering article describing facilities installed in the High Sierra for emergency repairs. Important facts pertaining to Southern California Edison Co.'s new Big Creek 4 hydro plant will be another engineering feature.

Everyone in the industry can get a lot of up-to-the-minute information on what's new and doing in the appliance and merchandising field from the News Letter. This feature is improving with every issue. Association-wise, next issue will carry reports on the PCEA Fresno meeting and the annual meeting of the California Municipal Utilities Assn. at Santa Cruz.

There also will be news of the industry and new product announcements.

ADVERTISING REPRESENTATIVES

Chicago (11) ..... Philip S. Griffin, 520 N. Michigan Ave.
Cleveland (15) ..... Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (14) ..... W. D. Lanier, 621 S. Hope St., MI. 3691
New York (18) ..... John P. Eichorn, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, 68 Post St., DO. 2-4600



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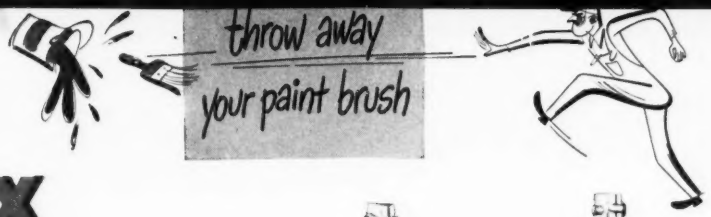


ELEMEX Capacitors

in stainless steel tanks...

do a good job...good enough to do it!

ELEMEX capacitors produce more pay load on a distribution system by supplying kilovars economically at or near the load. They cut copper losses, raise voltage, and increase carrying capacity of feeders and other equipment.

ELEMEX capacitors do this job well . . . they are good enough to do it for a long time. Highest quality, low-density paper used in each pack . . . humidity-controlled rooms . . . individual control of evacuation and capillary impregnation with ELEMEX liquid . . . step-by-step testing of each individual unit throughout production. Those are some reasons for their outstanding 5-year service record.

Many Desirable Features

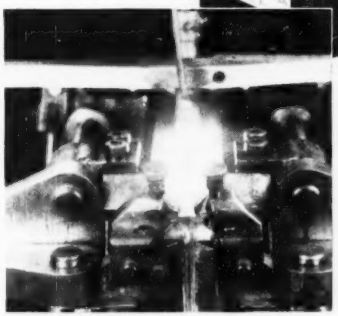
Stainless steel tanks . . . uniform terminal elevation above hangers for both 15 and 25 kvar sizes in each voltage class . . . L-M "Paragroove" connectors . . . L-M "Lifetime" solder-sealed bushings . . . sturdy, wood-reinforced shipping cartons.

Ask the L-M Field Engineer for the whole story; or write Capacitor Division, Line Material Company, Milwaukee 1, Wisconsin.

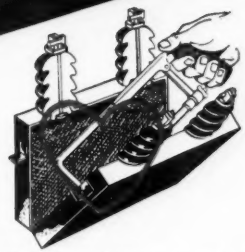
Corrosion-free Welding of Stainless Steel Tanks

ELEMEX capacitors come to you in stainless steel tanks, which never need painting. They save installation time because the lineman doesn't have to repair scratches or gouges caused by handling . . . doesn't have to scrape paint to get a good ground. And they *do* cut maintenance costs!

Tanks and covers are fabricated by the well-known Heliarc welding process. This method applied to stainless steel of very low carbon content assures a finished tank that is free of corrosion—*even at the welds.*



"Heliarc" welding of stainless steel tanks. Arc travels up one side, across, and down the other, butt-welding the seam visible in the slot in the jig.



Low Unit Stress Assures Long Life

Conservative design, with lowest stress on packs and insulation. Heavy laminated major insulation, folded at the corners without slitting, assures uniformly high impulse strength.

7130

LINE MATERIAL . . . Capacitors

Complete Coordinated Equipment for All Distribution Requirements

Ad L-M-7130—Electrical World, Sept. 24, Oct. 15, Nov. 19, 1949; Electric Light & Power, Dec., 1949; Electrical West, Nov., 1949

NO HALF-WAY MEASURES with GENERAL CABLE

- *Available on order as bare wire or weather-proof*
- *In solid and in stranded constructions*
- *For all voltages and in all sizes...*
- *including the HH hollow conductors.*

NO PREMIUM PRICE

Conductors of General Cable TENSILOK COPPER are quoted at exactly the same price as of Ordinary Electrolytic Copper.

CORPORATION

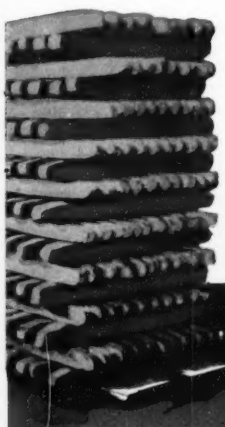
Look at these values in High Strength Retention on High-Temperature-Loaded Overhead Power Lines

95% Tensile Strength Retained After:

- 600 YEARS at 75° C
- or 100,000 HOURS at 100° C
- or 4,000 HOURS at 125° C
- or 250 HOURS at 150° C

An important *Added Factor of Safety* in long term resistance to annealing is inherent in General Cable's TENSILOK COPPER...On short lines substantially heavier base loadings may now be practical. On any lines, successive temperature overloadings of great magnitude can now safely be contemplated.

Hard-drawn TENSILOK COPPER stays hard, retains its tensile strength under conditions which would soon anneal commercial copper...The TENSILOK ultra-slow-annealing characteristic results from precise though minute metallic alloying. Purity, electrical conductivity, and tensile strength all exceed ASTM requirements for ordinary electrolytic copper.



- Time-endurance testing at the General Cable Research Laboratory has produced strength retention figures which outdistance anything heretofore known. Our Engineers will be glad to lay before you the as-yet-unpublished Performance Curves for Tensilok Copper, and to discuss its possible application to your "look-ahead" planning.

"More Power to You"

GENERAL CABLE

CORPORATION

Sales Offices in Principal Cities

Manufacturers of Bare and Insulated Wires and Cables for Every Electrical Purpose

users say

G. E.'S NEW ALL-PURPOSE* INSULATING VARNISH G-E 9574

Mr. J. Lindborg

From all parts of the country, enthusiastic reports are pouring in from users of G. E's new general-purpose varnish G-E 9574.

Here's a typical statement from J. Lindborg, owner and operator of AAA Electric Motor Service, Atlanta, Ga.

"Our experience has been that this varnish is as good as G. E. claims. It gives a good coat on every type of wire, bakes easily and dries to a tough coating that stands up perfectly in service. Also, this varnish works excellently with all types of coated wire and does not damage the insulation. We like the thinner, petroleum spirits, since it is cheap and can be purchased locally.

"During the two years we have been using this varnish we have had no complaints from any of our customers concerning our work."

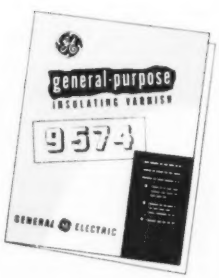
IF YOU HAVEN'T YET TRIED G-E 9574, get in touch with your local G-E Distributor, or write for our new bulletin to Section 24-11, Chemical Department, General Electric Company, Pittsfield, Massachusetts.

..."bakes easily"*

..."on every type of wire"

..."stands up perfectly in service"

*G-E 9574 gives excellent results on all types of coils except extra-high-speed armatures. It is one of G. E.'s complete line of electrical insulating materials.

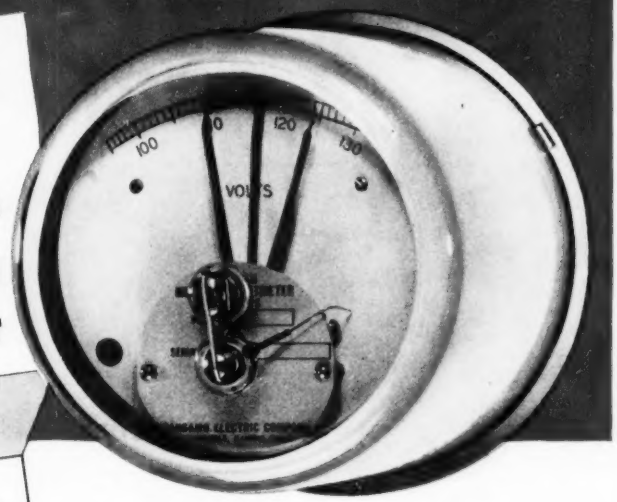


You can put your confidence in

GENERAL ELECTRIC

CD49-M6

LINCOLN
Type V-2S
(MAXIMUM-MINIMUM) indicating voltmeter



Valuable New Aid in Voltage Control

Saves Man-Hours Required by Periodic Surveys

Provides Continuous Information

You can save money two ways with this new Lincoln Indicating Voltmeter. It makes the use of graphic meters unnecessary in most cases, resulting in appreciable savings in meter investment; and when permanently installed, it saves the heavy labor cost of periodic surveys.

The voltmeter, time-lagged so that instantaneous values are not shown, is equipped with a maximum and a minimum voltage indicator on either side of a pusher pointer which is fixed to the actuating element of the meter. The pusher pointer spreads the indicators apart with changes in voltage. These indicators show the high and low average voltages occurring over a period of 10 minutes. The pusher pointer shows the average voltage at any time.

The Type V-2S will withstand surges of 12 kv level, is temperature compensated for outdoor use, and is supplied in socket construction suitable for outdoor installation. The entire scale of the meter is available for voltage ranges of 95 to 135 volts, or 190 to 270 volts, to meet your needs. Supplied also in graphic form—Type CCV—to provide a continuous *record* of average voltage.

Bulletin 483 gives full information.

50TH ANNIVERSARY SANGAMO 1899 - 1949

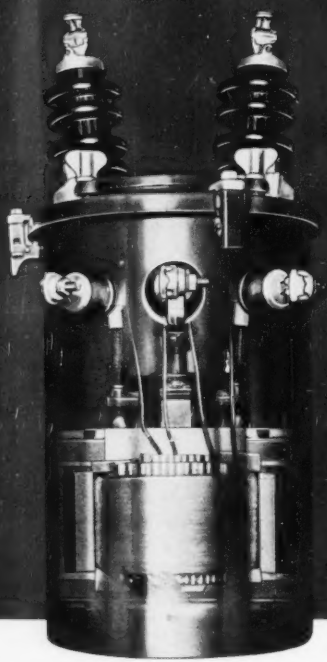
SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

SM4811

MOLONEY

HiperCore

DISTRIBUTION TRANSFORMERS



15 TO 30% LIGHTER

SMALLER SIZE

GREATER SHORT-TIME OVERLOAD CAPACITY

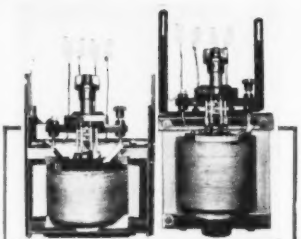
BETTER VOLTAGE REGULATION

Moloney HiperCore Transformers have cores of cold-rolled, high permeability, oriented silicon steel. The improved characteristics of this core material make possible reductions in transformer size and weight, better voltage regulation and increased short-time overload capacity.

Reductions in size and weight range from 15% to 30%. Because they are smaller and lighter, HiperCore Transformers are more easily and quickly installed on the poles . . . are easier to handle and take up less space on the line truck and in the storeroom.

Through lower impedance, better voltage regulation is possible at all loads with HiperCore Transformers. This means greater customer satisfaction . . . because of reduced secondary voltage fluctuations during sudden or intermittent load changes . . . and because of decreased voltage drop during peak load periods.

HiperCore Transformers have improved short-time overload characteristics which provide better peak load performance and longer life. Reduced coil mass, together with extensive use of cooling ducts, results in more rapid cooling of the windings and in a lower hottest-spot temperature gradient.



HiperCore core-and-coil unit and conventional type core-and-coil unit. Both are rated 3 Kva, 12470 Gr. Y/7200-120 240 volts. Smaller size of HiperCore unit achieved by use of wound cores made of high permeability, oriented, silicon steel.

MOLONEY ELECTRIC COMPANY

Sales offices in all principal cities

FACTORIES AT ST. LOUIS 20, MO., AND TORONTO, ONTARIO, CANADA

"Congratulations son... on your first quarter century"

In 1924, just twenty-five years ago, we broke ground for our plant at Emeryville, California. We were the pioneer eastern manufacturer to make an important investment in a plant to manufacture Galvanized Pole Line Hardware and Distribution Specialties on the Pacific Coast. Over the past twenty-five years we added to our plant and equipment until today our Pacific Coast operation is the largest devoted to this line, west of Chicago.

To say that we "took a chance" twenty-five years ago would be untruthful. What we did was to properly evaluate the driving force of the people and the business leaders on the Pacific Coast. It was as certain as day follows night that the empire of the West would evolve just as it did, and will continue to do.

We are grateful to the enterprise of those leaders in industry and the utilities, who courageously have invested of their time, thinking and money to keep ahead of the phenomenal development of the Pacific Coast. The race between growth and preparedness has been interesting, yes thrilling, to observe. We are happy to be part of it. We are certain that your great progress will gain in momentum, because the Pacific Coast will never rest on its laurels. Each succeeding generation of leaders has a challenge to meet in order to continue the progress of the pioneers. Yes, you will do it. The surface is only scratched.

HUBBARD AND COMPANY

OAKLAND, CALIF. · PITTSBURGH · CHICAGO

Be specific – Don't just

TYPICAL TEST RESULTS ON RUBBER COMPOUNDS

Use this table

The tabulation below lists representative values that have been obtained in actual tests of these rubber compounds.

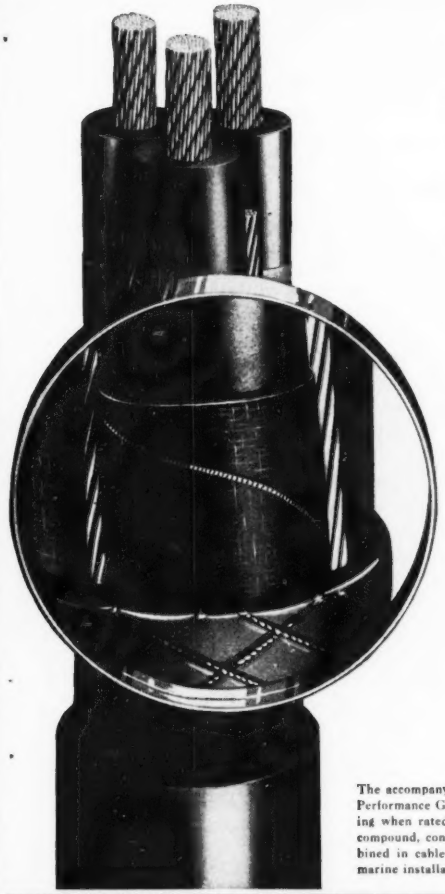
PROPERTIES AND TESTS		REPRESENTATIVE TEST VALUES FOR VARIOUS COMPOUNDS						
		AMARINE —40	AMERZONE —0	AMERZONE —B	AMARINE —RWS	AMERITE	AMPEROX	AMERPRENE
BASIC TYPE OF INSULATION		Natural Rubber	Oil-base	Butyl Rubber	Synthetic Rubber	Commercial 30%	Heat-Resistant	Polychloroprene
MAX. REC. COPPER TEMP.		60°C	75°C	80°C	75°C	60°C	75°C	80°C
ELECTRICAL CHARACTERISTICS	Dielectric Constant (Spec. Ind. Cap.)	4.0	4.0	4.0	4.5	4.5	4.5	....
	Ins. Res. (K)	50,000	7,500	40,000	30,000	30,000	20,000	100
	Dielec. strength in volts per mil	450	350	300	400	400	350	200
PHYSICAL PROPERTIES	Tensile Strength in lbs. per sq. in.	2000	600	700	950	1000 Synth. 1500 Nat.	1000 Synth. 1800 Nat.	2000
	Elongation in 2"	450%	300%	400%	450%	500%	500%	500%
	Permanent set	¼"	½"	⅜"	⅜"	¼"	¼"	¼"
ACCELERATED AGING	Type of test	Geer Oven	Geer Oven	Geer Oven	Oxygen Bomb	Geer Oven	Oxygen Bomb	Geer Oven
	Temperature	70°C	80°C	100°C	80°C	70°C	80°C	80°C
	Hours	288	168	672	168	504	336	168
	% Original Tensile Strength	70%	80%	80%	80%	85%	80%	90%
MOISTURE RESISTANCE	Gain in wt. after 7 days immersion at 70°C (Mg. per sq. in.)	25	....	20 or less	15 or less	35	35	30-60
	Capacity increase after 4 weeks immersion at room temperature	15%	15%	15%	10%	15%	15%	....
	Stability Factor 40-80 volts per mil 2 weeks at 50°C	.5%	1.5%	1.0%	.8%	2.0%	3.5%	....
SPECIAL PROPERTIES		High Voltage and Submarine use	Meets IPCEA ozone test	Withstands .03 conc. 10 hours	For hot and moist locations	General purpose rubber insulation	General purpose rubber insulation	Resistant to oil, flame and ozone

As the test data vary considerably with different sizes of conductor and thicknesses of insulation, these identical results can not be guaranteed throughout the whole range of sizes and voltage ratings. Some specific constructions will test higher and others will test lower than the listed values. However, the above table indicates in general what may be expected of these compounds.

AMERICAN STEEL & WIRE COMPANY

say Rubber

for detailed specifications



THE buyer of rubber-insulated cable today is faced with the dilemma of choosing between natural rubber, synthetic rubber, and a dozen different compounds of each.

The American Steel and Wire Company has always advocated the use of special rubber compounds to meet special requirements. To help you choose the right rubber compound, we recommend that you—

Specify	*For*
AMARINE-40	High voltage service under ground or under water, for all submarine power cables and for general use above 7500 volts.
AMERZONE	Ozone-resistance. Amerzone-0 is an excellent oil-base compound. Amerzone-B is a butyl rubber compound that is highly resistant to heat and moisture as well as to ozone.
AMARINE-RWS	Hot or damp locations. This is a compound notable for having low water absorption combined with excellent heat resistance
AMERITE	General use up to 7500 volts. A compound of the performance type recommended for use where copper temperatures will not exceed 60°C (140°F).
AMPEROX	General use up to 7500 volts where a heat-resistant compound is required for operation at copper temperatures up to 75°C (167°F).
AMERPRENE	Flexible jackets. Owing to its high content of Neoprene, this compound is resistant to oil, flame and sunlight.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

The accompanying illustration shows one of our standard constructions with Amerite Performance Grade around conductors; conducting rubber tape for non-metalic shielding when rated over 2000 volts. The cover is of Amerprene, a tough, hard-wearing compound, containing a high percentage of Neoprene. These compounds can be combined in cable constructions to fit the requirements of industrial, mining, and submarine installations.

USS

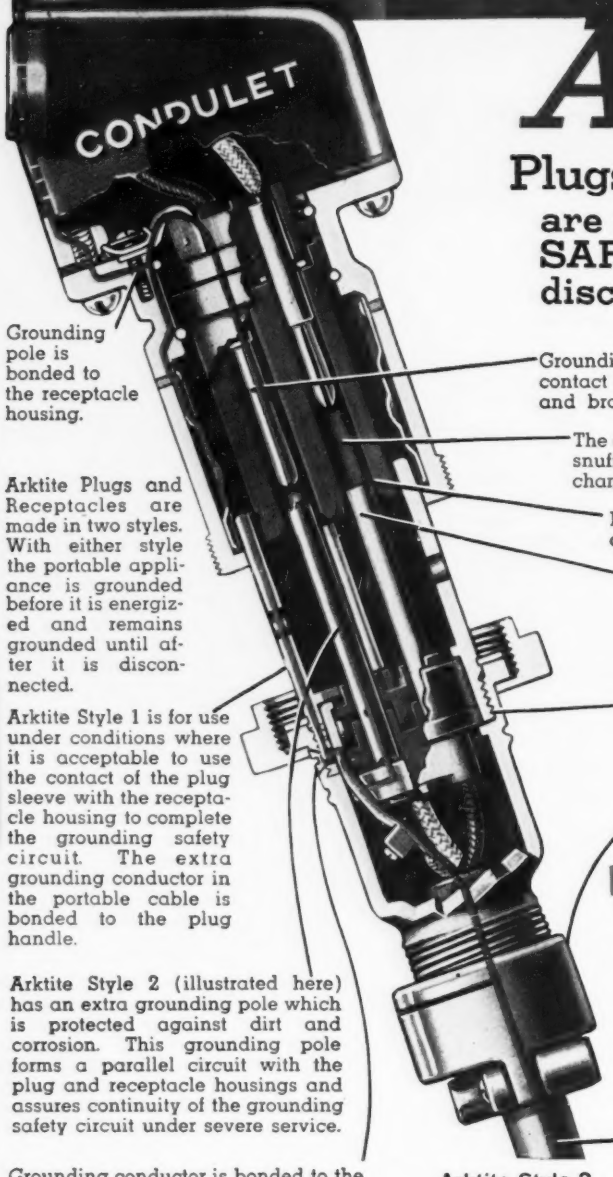
AMERCLAD CABLES

UNITED STATES STEEL

CROUSE-HINDS

Arktite

Plugs and Receptacles are circuit breaking and SAFE without additional disconnect equipment.



Grounding pole is bonded to the receptacle housing.

Arktite Plugs and Receptacles are made in two styles. With either style the portable appliance is grounded before it is energized and remains grounded until after it is disconnected.

Arktite Style 1 is for use under conditions where it is acceptable to use the contact of the plug sleeve with the receptacle housing to complete the grounding safety circuit. The extra grounding conductor in the portable cable is bonded to the plug handle.

Arktite Style 2 (illustrated here) has an extra grounding pole which is protected against dirt and corrosion. This grounding pole forms a parallel circuit with the plug and receptacle housings and assures continuity of the grounding safety circuit under severe service.

Grounding conductor is bonded to the plug handle.

Arktite Style 2. Sectional View

Grounding pole is longer than the others so contact in the grounding circuit is made first and broken last.

The arc formed by pulling the plug is instantly snuffed in the confined insulated arcing chamber.

Each plug contact fits closely the opening of its individual arcing chamber.

The arc is broken while the plug contact is still a considerable distance inside of the arcing chamber. There is no danger of the arc traveling over to the other side of the circuit or to the housing.

Two-piece plug is easy to take apart and reassemble.

Direct-pressure clamp insures positive grip on the conductor cable.

CROUSE-HINDS offers the only complete line of circuit breaking plugs and receptacles—20 Amp. to 400 Amp., 250 volt D.C., 600 volt A.C.

Complete listings are in the Condulet Catalog.

The green line indicates the grounding safety circuit.

A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

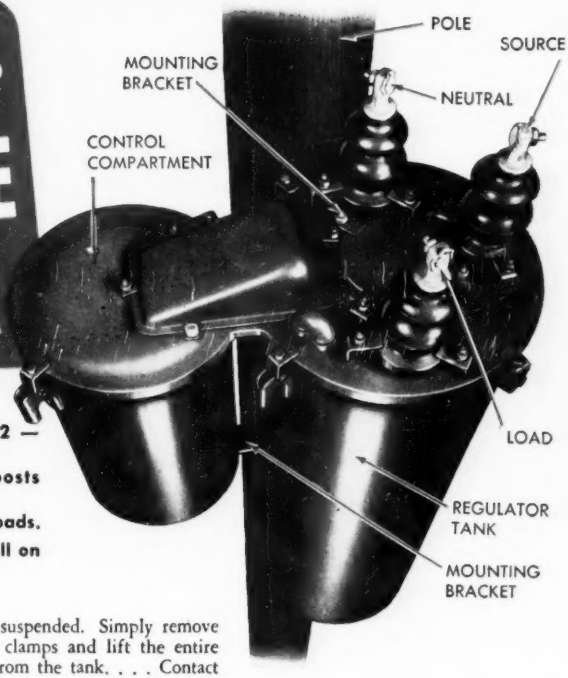
Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — Washington. *Resident Representatives:* Albany — Atlanta — Baltimore — Charlotte — New Orleans — Richmond, Va. — Salt Lake City
CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS • TRAFFIC SIGNALS • AIRPORT LIGHTING • FLOODLIGHTS

Regulate Rural Voltage ..Don't Just Boost It!

NEW ALLIS-CHALMERS 5/8% STEP

Pole-Type VOLTAGE REGULATOR



- ✓ **Provides full 20% range of regulation in 32 — 5/8% steps (10% raise and lower)**
- ✓ **Increases line and system capacity — boosts revenue.**
- ✓ **Satisfies customers — helps build additional loads.**
- ✓ **Costs but a few dollars per customer to install on average line.**

PROPER VOLTAGE REGULATION is more than just boosting voltage. It means providing adequate voltage during peak load — adjusting for light load. It means close control — and a wide range of regulation.

Here for the first time is city type 5/8% step voltage regulation from a small, low cost, pole mounted regulator.

Allis-Chalmers new pole type voltage regulator is fully automatic . . . regulates line voltage through a range of 20% in 32 small 5/8% steps, and holds ± 1 volt band. Rating is 10.8 kva, 15 amp, 7200 v, ± 10% regulation.

Easy maintenance — easy mounting — simple control are provided. First, it is cover-suspended. Simply remove four cover clamps and lift the entire regulator from the tank. . . . Contact life is long. . . . Quick-break mechanism eliminates arcing and pitting. In addition, because of small 5/8% steps, contacts interrupt smaller kva — last longer. Unit is mounted on pole as easily as distribution transformer. . . . Control requires just two simple knob adjustments to set.

Ask an Allis-Chalmers field engineer to determine the best means of improving voltage conditions on your rural system using voltage regulators. Contact a nearby A-C Sales Office or send in the coupon.

A-2779

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

A-C ALLIS-CHALMERS

WRITE FOR NEW BULLETINS

ALLIS-CHALMERS, 939A SO. 70 ST. MILWAUKEE, WIS.

☐ Send me descriptive bulletin plus "When and Where to Apply Rural Voltage Regulators"

☐ Have engineer call.

Name.....

Title.....

Company.....

Street.....

City..... State.....

Cables run COOLER... in TRANSITE DUCTS

... reducing copper losses

... increasing current capacity

... prolonging insulation life

HERE'S HOW to reduce copper losses ... increase current carrying capacity ... and prolong insulation life—run your cables in Transite* Ducts.

Current carrying capacities can be increased in a typical duct bank as much as 5%, or I^2R losses can be reduced 11%, for cables located in Transite as compared with other ducts used for power circuits.

And, Transite Ducts assure permanent duct banks because Transite is incombustible; is immune to rust and rot; is unaffected by electrolysis; will not slag under action of an arc, and will retain its high original strength.

An unusually smooth bore assures no injury to cable sheath, either in natural movement under load, or when pulling-in cables. Long, lightweight lengths can be quickly and economically installed.

In addition, a full line of fittings simplifies even the most complicated of installations.

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, N. Y.

*Reg. U. S. Pat. Off.

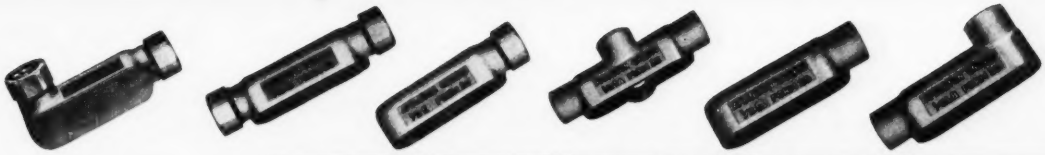
How Transite Ducts increase current carrying capacities

Type cable 3 cdr. 500 MCM Compack Sector, 15 KV (6th Edition AEIC Spec.)
No. of cables—3 (all loaded in one bank)
Daily Load Factor—75%
Earth Temp. ambient—20 C

	Transite	Other
Total Therm. Res. to Dielectric Loss (C watts/ft.)	5.66	6.17
Total Therm. Res. to Copper Loss (C watts/ft.)	4.44	4.95
Temp. Rise from Dielectric Loss (C)	1.9	2.1
Allowable Rise for Copper Loss (C)	59.1	58.9
Allowable Watts per ft. cable	4.44	3.96
Allowable Current—(Amps. per cdr.)	386.	365.
Allowable Current—(Relative %)	105.6	100.

Johns-Manville *Transite Ducts* **"KORDUCT"— for encasement in concrete**

"CONDUIT"— for use exposed and underground without encasement



Quality
ALL THE WAY!

APPLETON
Malleable Iron
UNILETS

Appleton Form 35 Malleable Iron Unilets save time. They eliminate loss due to damage and breakage. Available in threaded and no-thread types, their superiority over fittings made of any other material has been proven on thousands of construction and maintenance jobs!

The complete Appleton Line answers every fitting requirement, from simple steel outlet and switch boxes to big, heavy-duty explosion-proof types.

Write for Complete Catalog Information

- ✔ **Precision Engineered to Install Easily . . . Save Time!**
- ✔ **Smooth Finish . . . Clean Threads . . . Greater Wiring Room**
- ✔ **Made of Unbreakable Malleable Iron Lighter . . . Stronger**

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY
1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

LOS ANGELES 12, 100 N. Santa Fe Ave.
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SEATTLE 9, 115 Ray Street
DENVER 2, 1921 Blake Street

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

Now . . .

Pushmatic Service Electri-Centers provide push-button control, automatic protection!

Only the new BullDog Service Electri-Center, featuring *Pushmatic*, provides push-button control and automatic protection for electrical circuits.

Service Electri-Centers contain more wiring space, too. Revolutionary *Pushmatic* units, two-thirds the size of a pack of cigarettes, make the Service Electri-Center a wireman's dream.

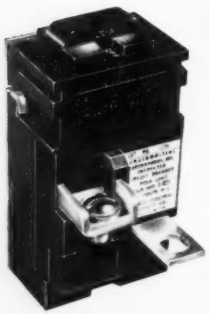
Each *Pushmatic* is an individual single-pole unit, making changes and additions a simple matter. No complicated group mountings to worry about.

Beautifully styled, BullDog Service Electri-Centers can be installed almost anywhere. Available in 2-, 4-, and 8-circuit cabinets, they are the last word in efficiency and protection.

Write today for *Pushmatic* Bulletin #494. It contains complete information and prices on Service Electri-Centers and the new *Pushmatics*.

Available in 2-, 4-, or 8-circuit cabinets, the handsome Service Electri-Center is ideal for homes, commercial buildings, garages, and small plants.

Pushmatic . . . a new kind of control and protection



Pushmatic is an individual single-pole unit . . . easier to add, remove or interchange than multiple units.

REVOLUTIONARY *Pushmatic* provides finger-tip control and automatic protection for electrical circuits. A simple push of the finger makes or breaks the circuit.

If power is broken by short or overload, just PUSH and service is restored. No more bothersome resetting by hand . . . no fuses to buy.

There are four types of *Pushmatics*: THERMAL ONLY, THERMAL-MAGNETIC, or either of these types with AMBIENT COMPENSATING FEATURES. All are identical in size and contour, in ratings of 15, 20, 30, 40, and 50 amperes, 120 V., 1 pole, or 120-240 V., 2 poles, AC. All are interchangeable for rating and type.

See *Pushmatic* Electri-Centers before you specify or buy any panelboards.

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

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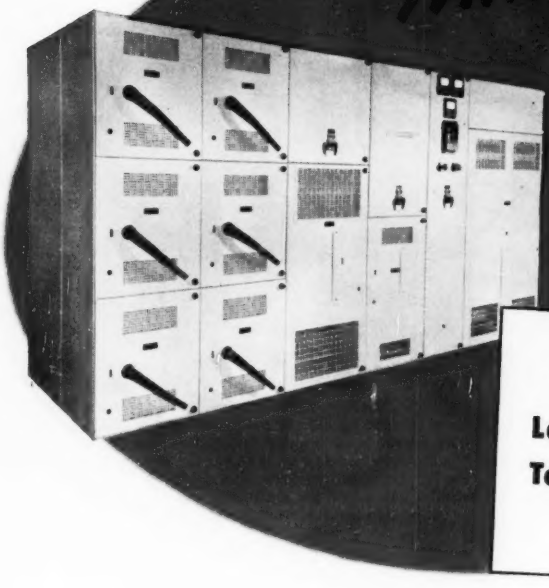
Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.

YOU CAN BE SURE.. IF IT'S
Westinghouse

Minimizes Installation Costs..



"UNITIZED"
Low-Voltage Switchgear
Tested, Shipped, Installed
as a Unit

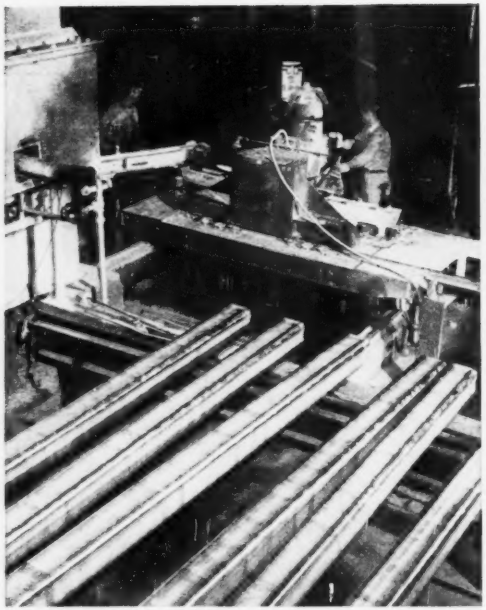
Westinghouse Switchgear goes right "on the line" without delays or high expenses in wiring or handling. All units are completely assembled, wired and tested before leaving the factory. Groups of assembled units reach the purchaser's plant ready to set in place and put into operation.

Factory tests assure hair-line accuracy in meters, relays and breakers. The Westinghouse "Unitized" method of building, shipping, installing and operating switchgear is your best way to cut costs, and save time . . . yet retain all the benefits of dependable performance and "custom-built" flexibility.

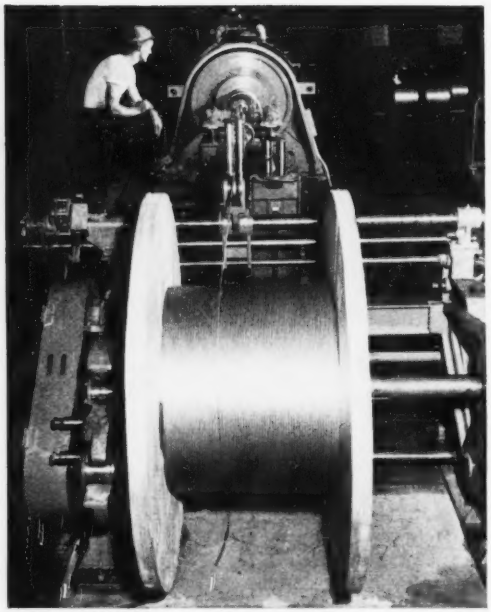
HERE'S COMPLETE information . . . The new Low-Voltage Switchgear Book gives clear, concise answers to your questions, plus complete ordering and installation data. Ask your Westinghouse representative for your copy of B-2296-D, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.
J-60714

Westinghouse
"UNITIZED"
LOW-VOLTAGE
SWITCHGEAR

From start... to finish...



AT PERMANENTE METALS' Newark, Ohio plant, the production of high quality Kaiser Aluminum Conductor starts in the remelt department. Here high purity pig from Permanente Metals' own reduction plants is remelted and cast into 99.5% purity ingots 6" square and 12' long. These pass through a series of automatic break-down and finishing mills to become rod ready for wire drawing.



ROD IS DRAWN into wire on the most modern equipment in the electrical conductor industry. High speed cable stranders, manned by skilled personnel, produce the finished conductor, which has been tested at every step by modern methods and equipment. Result of this completely integrated production control is pictured above — aluminum conductor of unsurpassed quality!

Controlled for quality!

As important as the high quality of Kaiser Aluminum Conductor is the consistently dependable deliveries assured by Permanente Metals' centrally located Newark, Ohio plant.

Early delivery schedules of all sizes of ACSR and all-aluminum conductor are now open. Write, wire or phone any office of Permanente Products' nationwide sales organization.

Permanente Metals

PRODUCER OF

Kaiser Aluminum

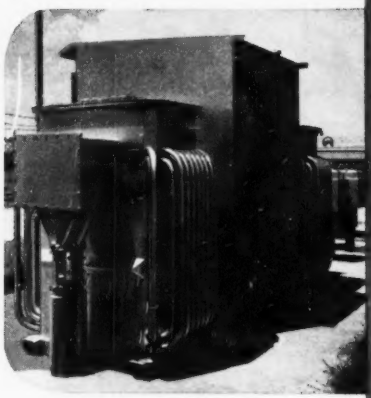
CONDUCTOR

SOLD BY PERMANENTE PRODUCTS COMPANY, KAISER BUILDING, OAKLAND 12, CALIF. . . . OFFICES IN: Atlanta Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee Minneapolis • New York • Oakland • Philadelphia • Portland, Ore. • Rochester, N. Y. • Seattle • Spokane • St. Louis • Wichita

Also available through General Electric Supply Corporation, Westinghouse Electric Supply Company, and Line Material Company.

power
FOR PRODUCTION

This bank of Wagner Power Transformers is part of the main substation at the Houston, Texas Refinery of Shell Oil Company, Inc.



A Wagner Unit Substation, one of several small substations serving in the same plant.

In addition to power transformers, Wagner manufactures Rural Line, Distribution and Substation Transformers. Whatever your transformer requirements may be Wagner can furnish the exact type of transformer to fit your need.

Wagner
TRANSFORMERS
can solve your power planning problems

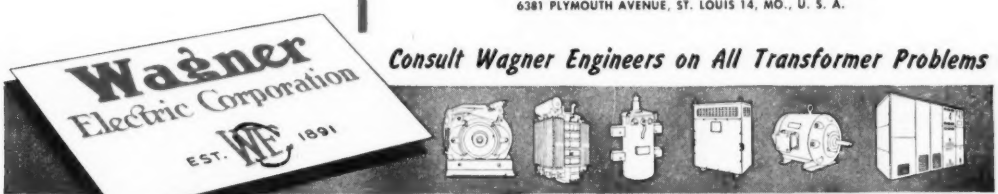
These power transformer installations, part of the recent catalytic cracking and lubricating oil plant extension at the Houston, Texas Refinery of the Shell Oil Company, are typical of Wagner Transformer installations for industrial power systems.

Wagner Power Transformers have established enviable records for continuous service in thousands of industrial plants and on transmission lines from coast to coast. Carefully controlled production methods, highest quality materials, rigid inspection and tests, and more than fifty-five years of transformer engineering experience mean that you can count on Wagner Transformers for dependable performance, plus added safety . . . added economy . . . and added service.

Users of power transformers will find it to their advantage to consult Wagner engineers on all of their transformer requirements. Wagner transformer users also profit by speedy, nationwide service facilities. Twenty-nine branch offices, manned by trained field engineers, are ready to serve you. Write for Bulletins TU-180 and TU-181 for information on the complete line of Wagner Transformers.

Wagner Electric Corporation
6381 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.

Consult Wagner Engineers on All Transformer Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS
ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

T49-2

Tops IN THE MILE-HIGH LEAGUE!

● The Public Service Company of Colorado handles electricity and gas distribution and transmission for its customers in the mountainous north-central portion of the state. For maintenance work, for readings, for "cutting in" new equipment in inaccessible areas where other means of communication are not available, the company finds G-E radio an indispensable, money-saving tool.

This utility's trouble trucks, line trucks, patrol vehicles and compressors, as well as supervisors' cars are in touch with one another and with headquarters at Denver by radio.

J. M. Wissenbach, Engineering Department, shown above, reports that dispatching by G-E radio *materially cuts elapsed time between receipt of complaint and adjustment of trouble.*

General Electric specializes in radio communication systems for utilities faced with difficult problems of terrain or weather. For complete information call the G-E office nearest you or write: *General Electric Company, Box 1122, Electronics Park, Syracuse, New York.*

Before You Select Any Radio Communication Equipment—

Get This Bulletin FREE!

Colorful booklet about General Electric radio communication will be sent to you on request. Ask for it.

You, too, can put your confidence in—

GENERAL ELECTRIC

SHERARDUCT—THE *fortified* RIGID STEEL CONDUIT

SHERARDUCT is *fortified* against rust and corrosion by a zinc coating driven into the pores of all surfaces—inside, outside and *threads*. This coating is alloyed with the steel by the Sherardizing Process, and is an integral part of the tube itself.

SHERARDUCT is still further protected by the smooth "Shera-Solution" coating, baked on for added endurance against acids and other corrosive agents.

SHERARDUCT will not crack or split! Bending does not harm the fortified protection, because the coating is an integral part of the steel itself!

Specify **SHERARDUCT**—the *fortified*, full weight, threaded, rigid steel conduit. Sold through leading electrical wholesalers.

NATIONAL ELECTRIC PRODUCTS
WIRING 6 SYSTEMS
WIRES AND CABLES

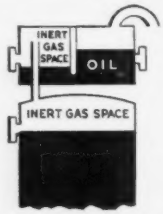
National Electric
PRODUCTS CORPORATION
1309 CHAMBER OF COMMERCE BLDG., PITTSBURGH 19, PA.

Four Reasons for

TWO WAYS to increase the return on your transformer investment are to reduce rate of depreciation and trim maintenance costs. These objectives are accomplished in Allis-Chalmers power transformers with features like those below. These four features, when added together over the life span of the transformer, can make a *big difference* in your power transformer operating costs. Here's why:

1 SIMPLE, POSITIVE OIL PROTECTION

Oil-Sealed Inert Gas oil protection, introduced by Allis-Chalmers, operates practically without attention. No replenishment of gas containers necessary. Low pressure system (not over 1 lb per sq in.) extends gasket life. Effective oxygen, moisture seal eliminates sludge and acid formation in transformer oil.



2 LONGER GASKET LIFE

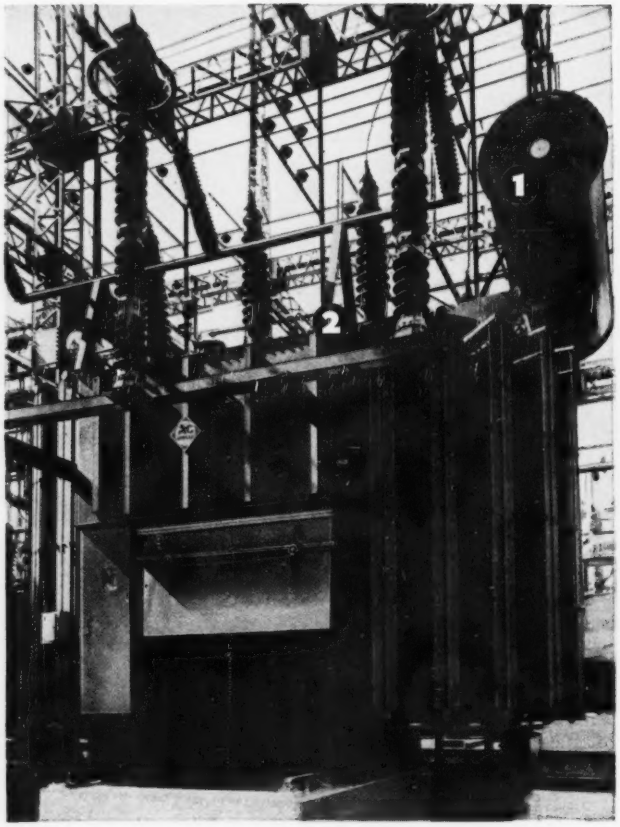
A seemingly small detail like gasketed seals quickly assumes great importance when they fail to function properly and costly maintenance is required. On Allis-Chalmers power transformers, maximum gasket life and effectiveness are *assured* through metal-to-metal controlled gasket compression.

3 LOW UPKEEP FOR RADIATORS

Radiators are rigidly braced, grooved for added strength. Surface is protected with bonderized coating, followed by two coats of high quality outdoor paint. When repainting is desired, the job is made easier because radiators have staggered cooling fins.

4 SIDE OPERATED TAP CHANGER

It's easier, and takes less time to change taps with Allis-Chalmers No Load Tap changer because of its side-of-tank location. There's no danger of coming in contact with high voltage overhead system. Tap positions are easily read from ground level.



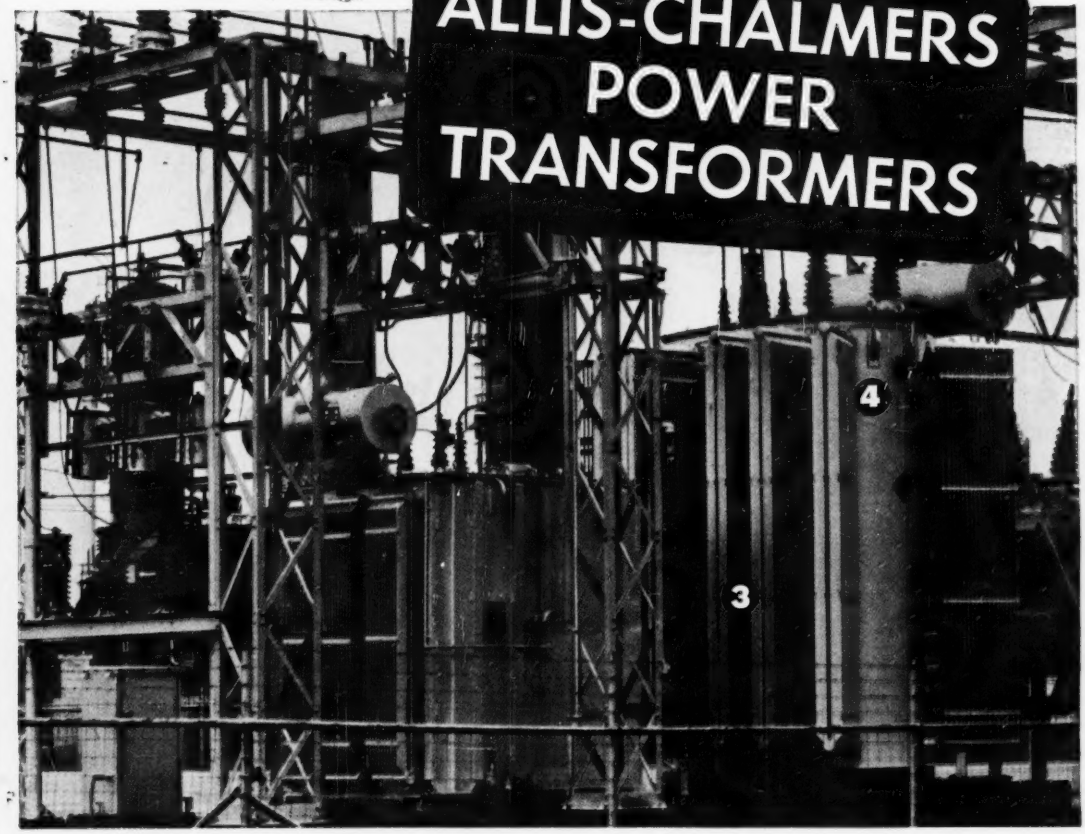
INTERCONNECTING three systems at a large Indiana substation, this transformer is rated 24,000/30,000 kva, 3 phase, 138-69-34.5 kv. Since its installation in 1945, two duplicate units have been ordered. Typical Allis-Chalmers low-maintenance construction includes the four features at left.

ALLIS

Pioneers in Power

Low Maintenance

IN ALLIS-CHALMERS POWER TRANSFORMERS



ALLIS-CHALMERS TRANSFORMER and regulator work together, serving an important load in Louisiana oil producing area. Transformer is equipped with four 2½% full capacity taps below normal — regulator supplies ±10% regulation in ⅝% steps.

Again, *Oil-Sealed* Inert Gas Protection and other features at left are a part of the Allis-Chalmers low-maintenance design.

For details on Allis-Chalmers quality transformer construction, contact your nearby A-C sales representative. Or write direct.

A-2852

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

Oil-Sealed is an Allis-Chalmers trademark.

CHALMERS

A-C ALLIS-CHALMERS

and Electrical Equipment from Generation through Utilization

WRENCH IT!

Interlocked—seam hubs won't give, turn or break off!

SOCK IT!

If abnormal abuse should deform the steel, just bend it back again—the interlocked-seam hubs will stay watertight!

DROP IT!

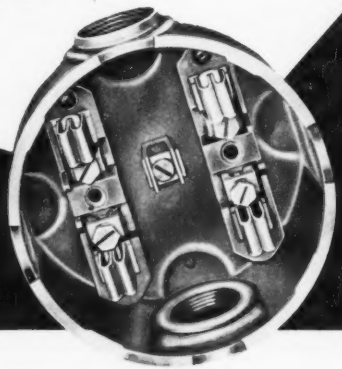
Even screwed onto a twelve-foot length of conduit, this socket takes terrific punishment!

NOW!

NEW STRENGTH! NEW STAMINA! NEW ENDURANCE! in the IMPROVED Murray Steel METER SOCKET

How do we do it?

Take a look at this precision interlocked seam that anchors hubs to shell in the improved Murray meter socket. Engineers said it couldn't be done—yet here it is. Rigid . . . rugged . . . waterproof—these hubs can't loosen up, can't fall out, can't break off. No welds, no die castings, no flimsy alloys—just tough, sturdy, dependable steel.



Murray

MANUFACTURING CORPORATION

50 Years of Service to the Electrical Industry

1250 ATLANTIC AVENUE • BROOKLYN 16, NEW YORK

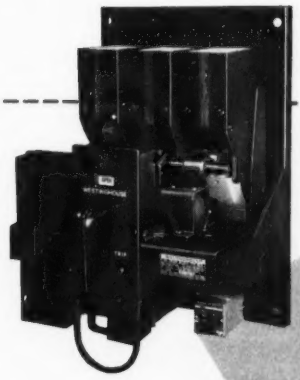
The *improved* Murray steel meter socket is weatherproofed by zinc coating and baked-on melamine finish. Two or three hubs, size 1" or 1¼"; four, five or six jaws. Reversible jaws for horizontal or vertical mounting. Solderless connectors can be swung into the gutter for bussing. Connectors take No. 1 wire.

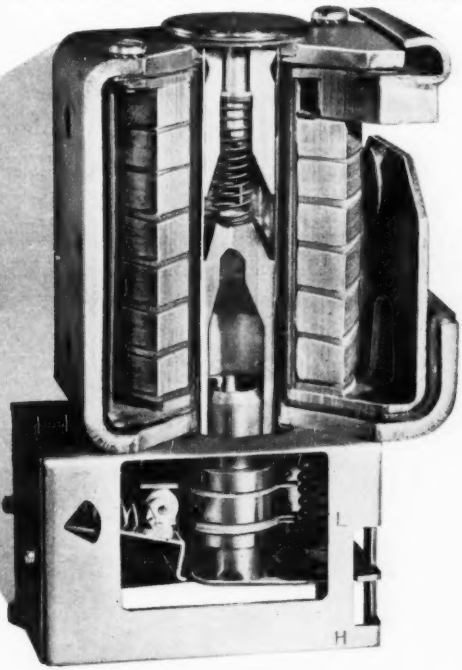
The *improved* Murray meter socket is available either separately or in this preassembled yard-pole combination with Murray fully magnetic circuit breaker protection, approved by R.E.A. Write for complete specifications.

SERVICE ENTRANCE & METER EQUIPMENT • MAGNETIC CIRCUIT BREAKERS
SWITCHES • CURRENT LIMITING REACTORS • CROWS'NEST AERIAL LADDERS

YOU CAN BE **SURE**.. IF IT'S

Westinghouse





TRIPS.. to protect

DELAYS.. to select

the NEW DB Breaker Tripping Device

Here's a new overcurrent device that trips instantaneously on fault currents reaching a predetermined value . . . yet delays tripping on overcurrent caused by motor starting or other overloads of short duration. Also available—selective operation that causes only the breaker nearest a fault to trip. Breakers nearer the power source keep current flowing in unfaulted parts of the circuit.

This tripping device is the "mainspring" for the new Westinghouse DB Breaker—a breaker that's smaller, more dependable, more flexible, and has a longer life. Get top breaker performance, plus "one-unit" overcurrent protection, in your low-voltage system. Install the DB.

Here's the COMPLETE Story . . .

Get answers to your questions, plus complete information from the new DB Breaker Booklet. Ask your Westinghouse representative or distributor for B-4067. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60720

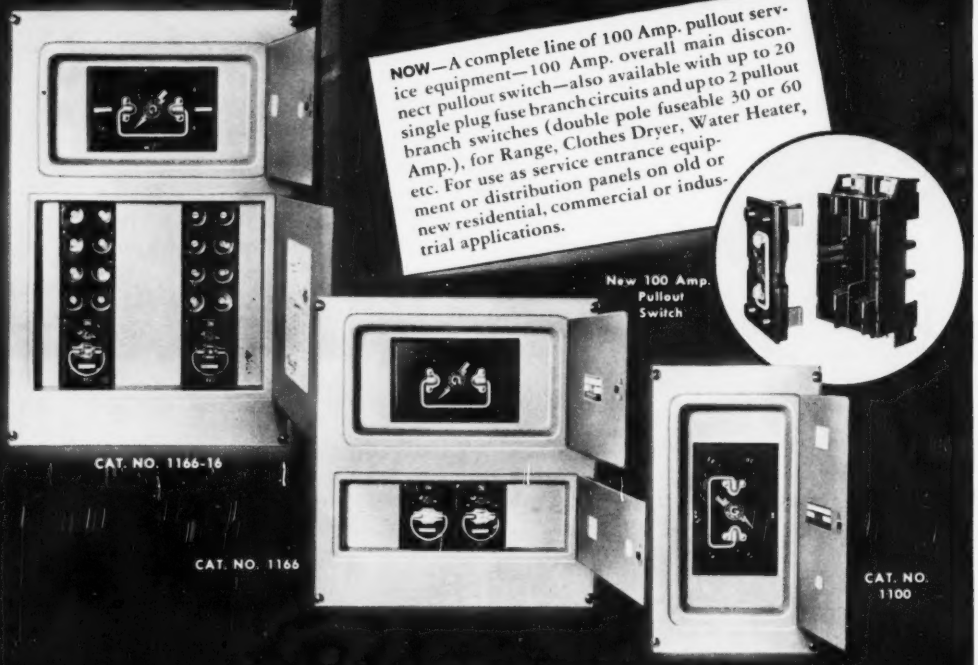
Westinghouse

"DE-ION" CIRCUIT BREAKERS

New Type DB

The latest reason why the Switch is to General

NOW—A complete line of 100 Amp. pullout service equipment—100 Amp. overall main disconnect pullout switch—also available with up to 20 single plug fuse branch circuits and up to 2 pullout branch switches (double pole fuseable 30 or 60 Amp.), for Range, Clothes Dryer, Water Heater, etc. For use as service entrance equipment or distribution panels on old or new residential, commercial or industrial applications.



Service Equipment with 100 Amp. Main Disconnect

GENERAL'S new 100 Amp. pullout service equipment is modern in design, appearance and performance and the latest result of General's long range product development program. Examine the construction features of this new equipment at your earliest opportunity. Available everywhere exclusively through wholesalers.

Have you seen . . .

. . . the new light gray baked enamel finish on all items in the General line?

•

. . . the way General packages most items in individual cartons?

•

. . . the new designs with more knockouts and knuckle room?

The New catalog supplement 4911 completely describing the 100 and 200 Amp. lines?

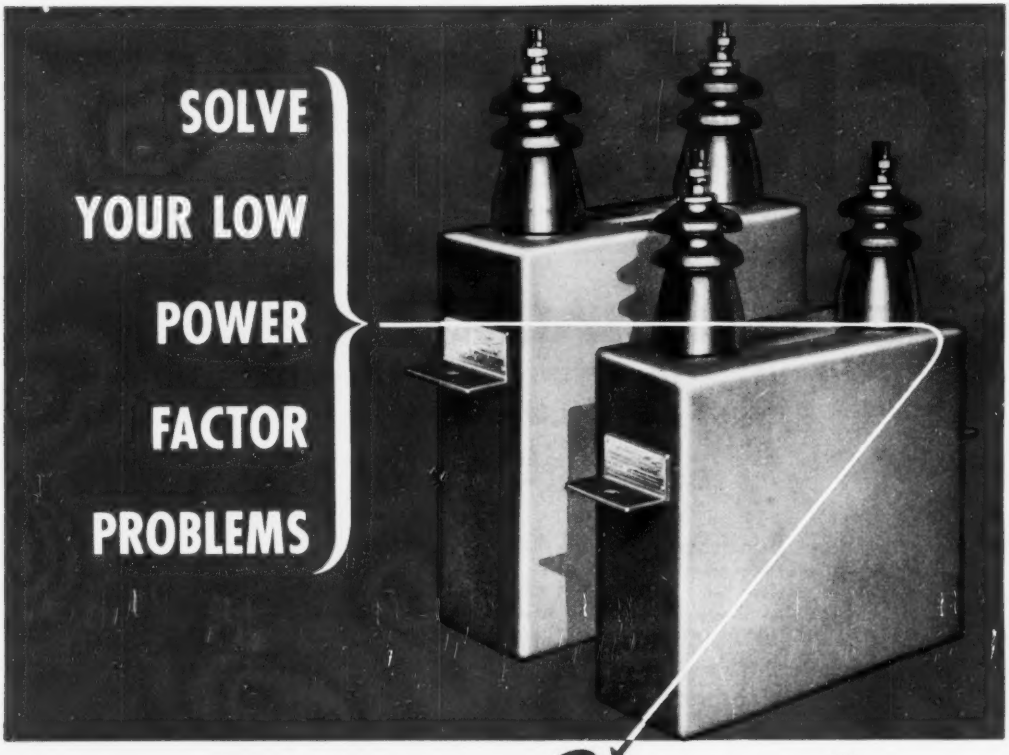
The latest General Switch Catalog 4809 with price list supplement 4905?

Ask your wholesaler or write today!

General Switch Corp.

49 Roebling Street Brooklyn 11, N. Y.

SALES OFFICES IN EVERY MAJOR CITY



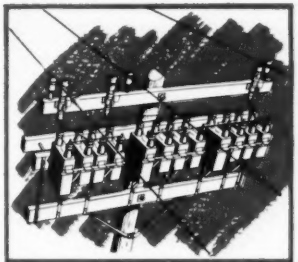
with MOLONEY *Capacitors*

Reduce reactive Kva by using shunt capacitor installations and increase your distribution system's ability to handle "pay" load. Proper use of capacitors will release generator, transformer and feeder line capacity that is now tied up with non-revenue producing reactive Kva. Further dividends are provided by capacitors in lowered line losses and decreased line voltage drop.

Moloney Capacitors are designed to give long, trouble-free service. They are built to the same high standard of quality that is characteristic of Moloney Transformers.

MOLONEY CAPACITOR FEATURES

- ★ Long life through high impulse strength and low unit voltage stress.
- ★ Copper-bearing steel cases—welded construction (16 gauge). Domed top to shed water.
- ★ Hermetically sealed to prevent entrance of moisture. Tanks are pressure tested for leaks.
- ★ Vacuum treated under elevated temperature to remove moisture and air. Then they are impregnated and filled with non-inflammable Askarel liquid. Suitable for outdoor or indoor installation.
- ★ Solderless type terminals arranged to take two conductors ranging from No. 8 solid to No. 2 stranded, permitting convenient connection in banks.



Capacitors provide the quickest and most economical means of relieving system overloads and improving voltage conditions where low power factor loads prevail. Capacitors may be obtained from stock, and installed costs are low...less than $10 per Kvar.

MOLONEY ELECTRIC COMPANY

Sales offices in all principal cities

FACTORIES AT ST. LOUIS 20, MO., AND TORONTO, ONTARIO, CANADA

CRESCENT

A B C ARMORED CABLE

Has These Improved Features Which Make Installation

EASIER—QUICKER—SAFER

Bond Strip Under Armor

Permanently low armor resistance **is provided in sizes No. 14 and 12 AWG by use of a flattened, bonding wire which is in contact with the under side of each convolution.**

Prefabricated Break Lines

The Cut Mark (at 1½" intervals) shows the location of a prefabricated breaking line inside the armor. Only a few strokes of a file or saw guided by the Cut Mark are required to cut through one outer ridge, and a bend by hand severs the armor. This results in a clean separation with no sharp edge—a safer, easier and faster job. The prefabricated breaking lines are so designed that there is *no reduction* in tensile strength, bending quality, crushing resistance and electrical conductivity of armor.

FILE OR SAW

BREAK

PULL OUT PAPER

INSERT BUSHING

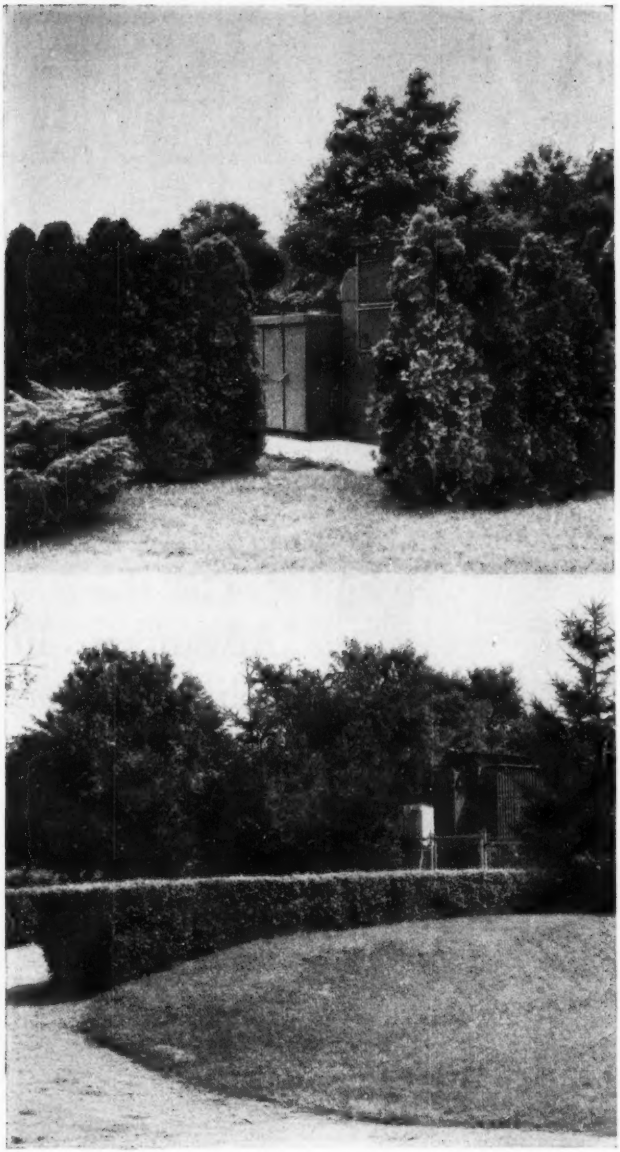
In the last 20 years alone, over SIX BILLION FEET of Armored Cable have been produced by the industry. Armored Cable provides the only general purpose, factory-assembled and tested, metal protected wiring system.

CRESCENT WIRE & CABLE

CRESCENT INSULATED WIRE & CABLE CO.

TRENTON, N. J.

OVER 60 YEARS EXPERIENCE



THE PROBLEM OF

SUBSTATION APPEARANCE

IN RESIDENTIAL AREAS IS

EASILY OVERCOME WHEN YOU

INSTALL GENERAL ELECTRIC

UNIT SUBSTATIONS . . . .

THEIR INTEGRATED DESIGN

MAKES THEM EASY TO LANDSCAPE

AND THUS OVERCOME

APPEARANCE OBJECTIONS.

ASK YOUR G-E REPRESENTATIVE

FOR BROCHURE GEA-5155

THAT SHOWS HOW OTHER

UTILITIES TOOK ADVANTAGE OF

G-E ENGINEERING AND SERVICE

(TWO EXAMPLES AT LEFT).

OR WRITE TO . . . .

APPARATUS DEPARTMENT

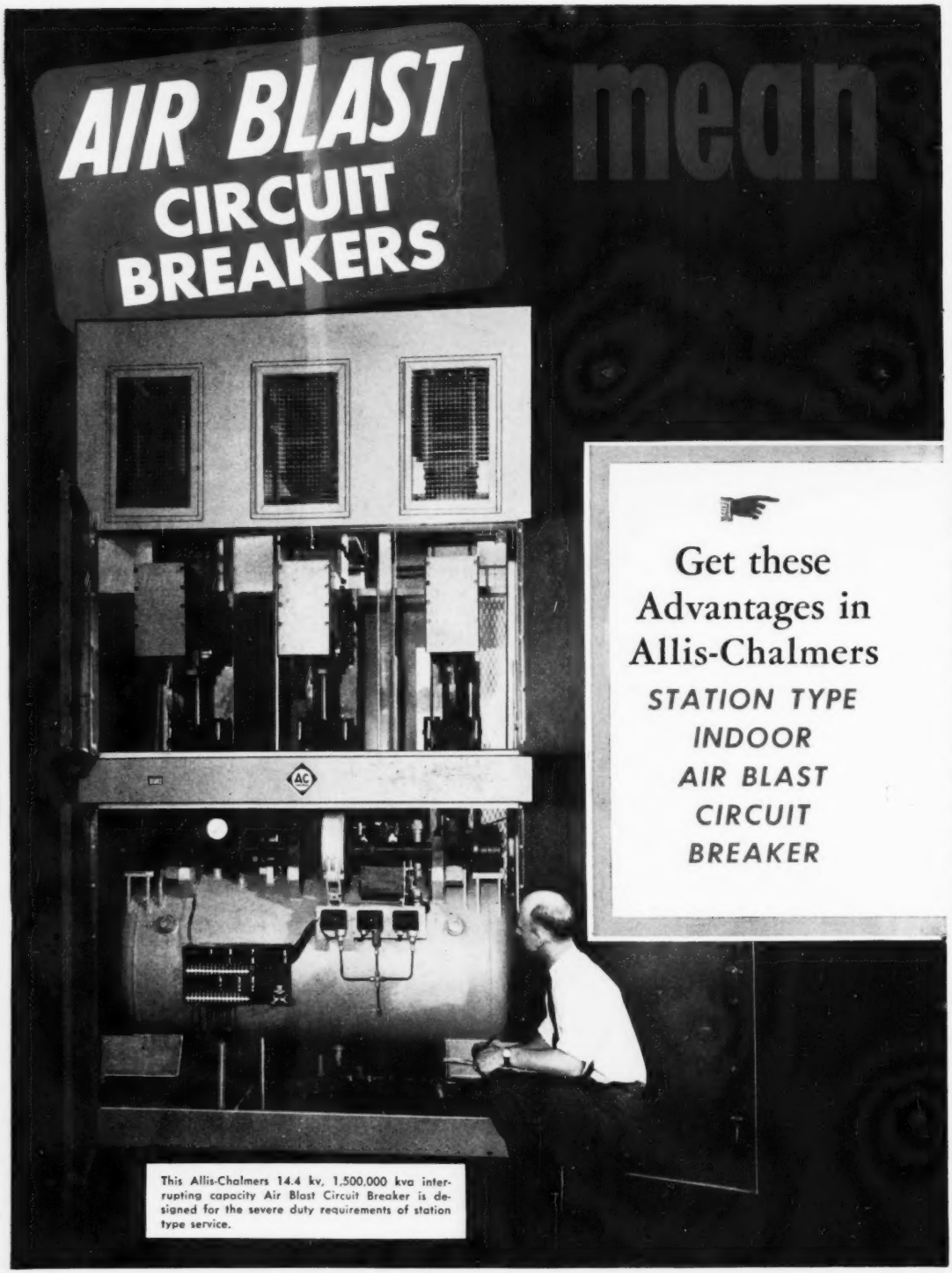
GENERAL ELECTRIC COMPANY

SCHENECTADY 5, NEW YORK

GENERAL ELECTRIC

321-62

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.


AIR BLAST
CIRCUIT
BREAKERS
mean
Get these
Advantages in
Allis-Chalmers
STATION TYPE
INDOOR
AIR BLAST
CIRCUIT
BREAKER
This Allis-Chalmers 14.4 kv, 1,500,000 kva interrupting capacity Air Blast Circuit Breaker is designed for the severe duty requirements of station type service.

Greater Safety-Low Maintenance

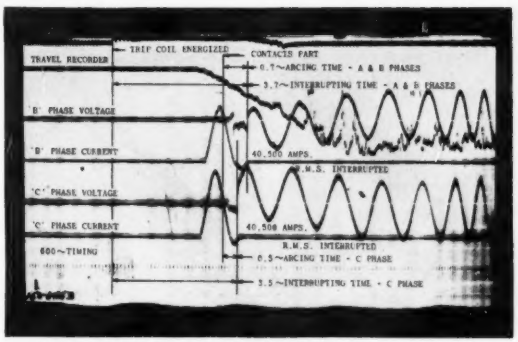
RATINGS AND PERFORMANCE FULLY PROVED by 3 phase interrupting capacity tests.

ACTUAL INTERRUPTING TIME LESS THAN 5 CYCLES . . . minimizes system disturbances, eases strain on connected equipment.

ARCING TIME ONE CYCLE OR LESS! Prestored compressed air *blasts* out arc for fast interruption.

SAFE DEPENDABLE OPERATION. Breaker is completely enclosed within grounded steel housing. Operation is electrically and pneumatically trip free.

LOW COST MAINTENANCE. Negligible contact burning because of low arcing time. Entire breaker is accessible through hinged doors.



TYPICAL OSCILLOGRAM CURVES SHOW FAST CIRCUIT INTERRUPTION AND SHORT ARCING TIME OF THE TYPE AB-15 AIR BLAST CIRCUIT BREAKER

FULLY PROVED, modern Allis-Chalmers Air Blast Circuit Breakers can be supplied in 14.4 kv ratings, up to 2,500,000 kva interrupting capacity, in accordance with the new ASA standards.

Allis-Chalmers air blast breakers are factory assembled complete with cubicle, necessary control equipment and breaker air storage tank, ready to install and operate.

For more information on the advantages of this modern, oil-less air blast power circuit breaker, contact your nearby A-C sales office. Or write direct.

A-2794

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

A-C ALLIS CHALMERS

ALLIS-CHALMERS

Get your Free INDENTER

Cross Section Showing Indentations.

Here is your chance to get a free Briegel Indenter — the tool that saves more time installing thin wall tubing than anything else on the market. This Special Package Offer is made up of 400 1/2" Briegel Connectors and 200 1/2" Briegel Couplings — enough to wire three average six room houses — and One Original Briegel Indenter all for the price of the fitlings alone.

The Briegel Method of installing thin wall is not only faster and less expensive but also neater in appearance and more permanent.

Cash in on this free offer while it lasts. Save time and save money on your original purchase and on the job with Briegel Fittings!

This offer available at all leading wholesalers.

All B-M Fittings Carry the Underwriters' Seal of Approval

This offer subject to withdrawal without notice

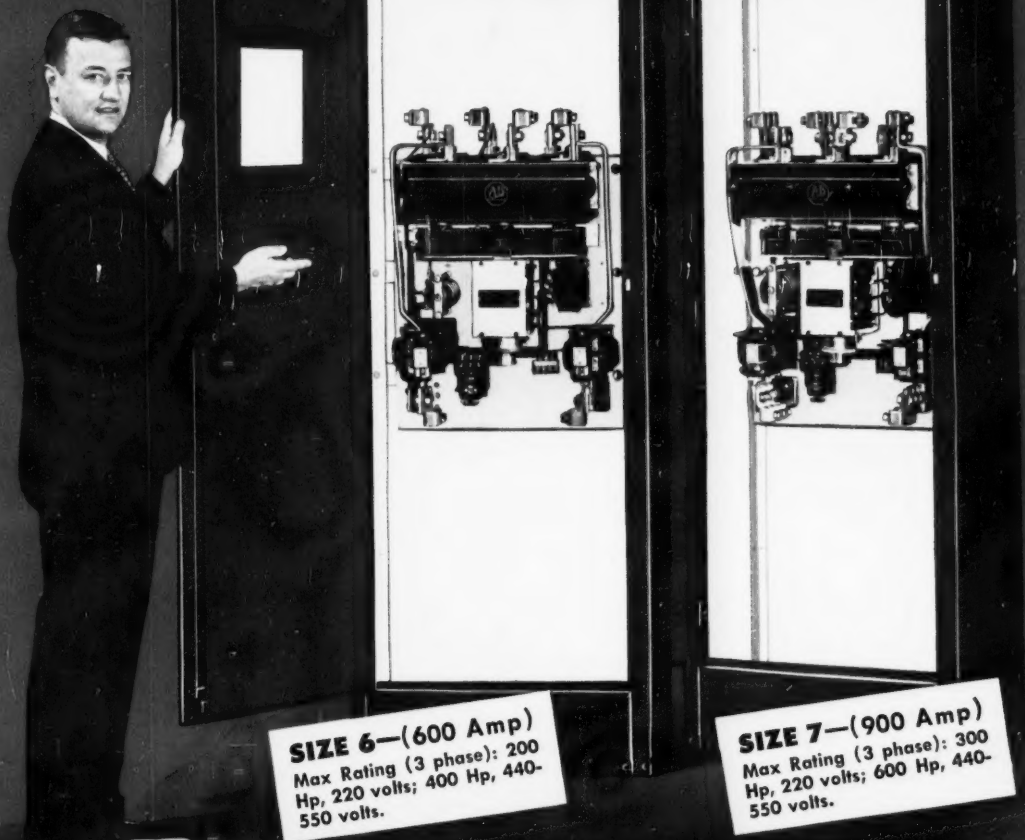
Insist on Briegel All-Steel Approved Couplings and Connectors. These are the Original Labor-Saving Indenter Type Fittings used by contractors for over 15 years.

BRIEGEL METHOD TOOL CO.

GALVA • ILLINOIS

Announcing...

The *NEW* Size 6 and Size 7 SOLENOID Starters



SIZE 6—(600 Amp)
Max Rating (3 phase): 200 Hp, 220 volts; 400 Hp, 440-550 volts.

SIZE 7—(900 Amp)
Max Rating (3 phase): 300 Hp, 220 volts; 600 Hp, 440-550 volts.

A-B Quality

ALLEN-BRADLEY

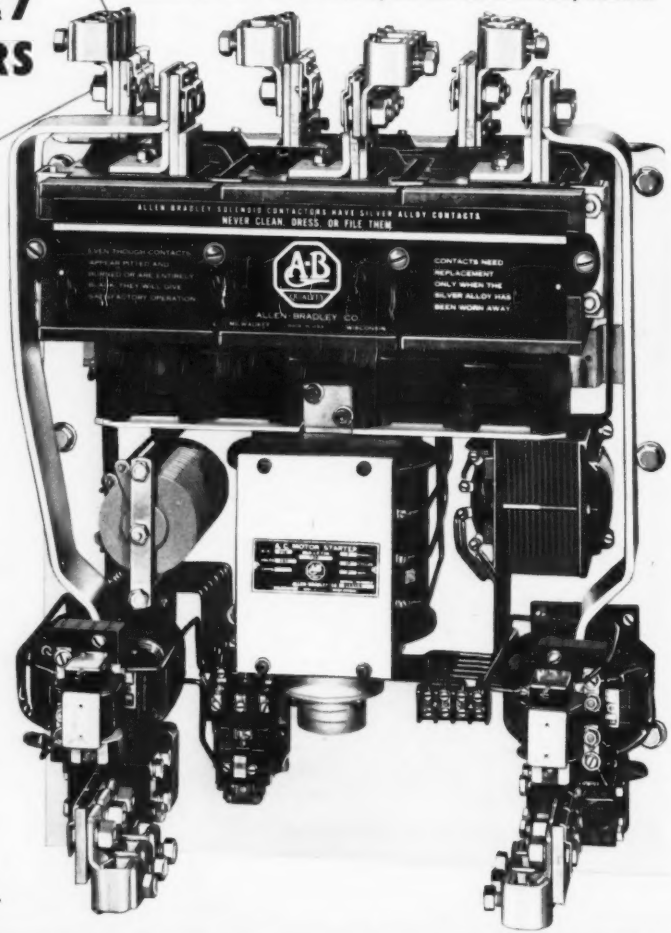
SOLENOID MOTOR CONTROL

SEE OTHER SIDE

Now- All the Advantages of SOLENOID design

in the NEW SIZES 6 & 7 STARTERS

In years of service, under all operating conditions, the Allen-Bradley solenoid construction has proved its superiority beyond all question of doubt. Now Allen-Bradley has developed Sizes 6 and 7 solenoid starters . . . with all the features that have proved so successful in smaller Allen-Bradley starters. Check its many features.


ALLEN-BRADLEY SOLENOID CONTACTORS HAVE SILVER ALLOY CONTACTS
NEVER CLEAN, DRESS, OR FILE THEM
CONTACTS NEED REPLACEMENT ONLY WHEN THE SILVER ALLOY HAS BEEN WORN AWAY
A-B
ALLEN-BRADLEY CO.

SILVER ALLOY CONTACTS

The double break, silver alloy contacts never require cleaning or filing—a distinct advantage over conventional copper-to-copper contacts.

SIMPLE, RUGGED CONSTRUCTION

These starters have no pins, pivots, hinges, or complicated mechanisms to cause trouble. The solenoid switch mechanism has only one moving part.

SMALLER SIZE

The open type Size 6 starter is less than ¼ as large as conventional starters, and the enclosed unit takes only 58% of the floor space. Size 7 is even smaller, compared with other starters.

STEEL PANEL MOUNTING

The switch is mounted on a metal base plate instead of a slate panel, and is self insulated. It can be quickly and easily mounted to metal surfaces without additional insulation.

FRONT-OF-PANEL WIRING

All terminals and wiring are readily accessible from the front. There is no back panel wiring.

AVAILABLE IN MANY FORMS

Size 6 and Size 7 solenoid switches can be furnished in 2 pole or 3 pole contactors, across the line starters, reversing switches, reduced voltage starters, and many other combinations where clapper type switches were previously used.

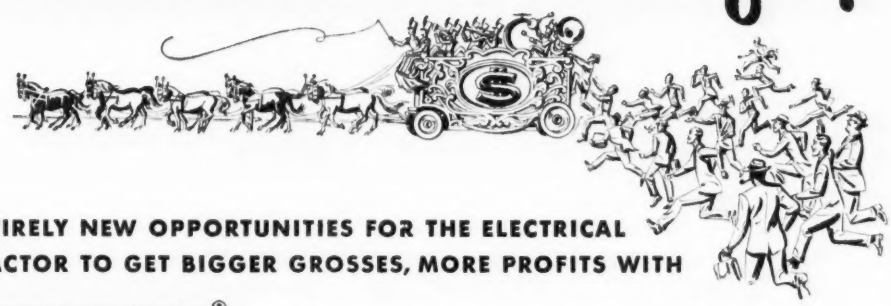
Write for Information

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.

A-B Quality

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

"Get Aboard this Profit Bandwagon!"



ENTIRELY NEW OPPORTUNITIES FOR THE ELECTRICAL CONTRACTOR TO GET BIGGER GROSSES, MORE PROFITS WITH

USKON® RADIANT HEATING UNITS

USKON is the world's most modern heating system—and it's the *exclusive* business of the Electrical Contractor. Uskon actually puts you, the contractor, into the heating business, triples your dollar volume—while giving the customer a more efficient heating system.

WHAT IS USKON? Uskon heats by radiation, as does the sun. The heating units are electrically conductive rubber sheets, sandwiched between rigid insulating layers. Installed in the ceiling, these panels provide even, healthful warmth. The conventional boiler, radiator, pipes, fuel storage, chimney and cellar are eliminated. Uskon is invisible, the panels become part of the ceiling structure.

ALL USKON INSTALLATIONS WILL BE HANDLED BY ELECTRICAL CONTRACTORS. Installation of Uskon is simple, but each job must be specifically designed to the particular requirement. U. S. Rubber building wire is used. An Uskon job will require from four to five times more wiring materials and labor than the usual contract.

SUBSTANTIAL MARGINS OFFERED TO THE CONTRACTOR. For selling and properly installing Uskon, the electrical contractor receives a substantial margin. In commercial and industrial applications the profit opportunities are proportionately greater.

Take advantage of this opportunity to get into the heating business. Write Uskon, Graybar Electric Company, 420 Lexington Avenue, New York 17, N. Y., or direct to Electrical Wire and Cable Department, U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y.

NO FURNACE, NO PIPES, NO FUEL STORAGE • NO ASHES, DIRT OR DUST
NO RADIATORS. USKON IS "INVISIBLE."

NOW APPROVED BY UNDERWRITERS' LABORATORIES, Inc.

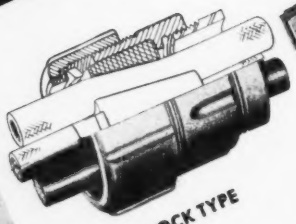
A PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

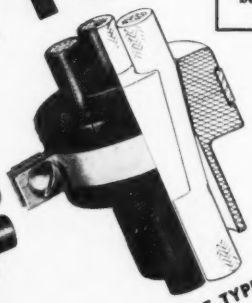
3 WAYS TO MAKE SURE CABLES STAY PUT!

National Electrical Code paragraph 3014 specifies intervals at which cable supports must be used in vertical raceways.

CONDUIT TYPE



LOCK TYPE



SPLIT TYPE

When you're looking for a better way to hold cables fast, protect connections against pull or vibration—install O. Z. Cable Supports.

WHY?

BECAUSE O. Z. makes the *only* cable supports with one-piece impregnated maple plugs, machined to the exact wire size.

BECAUSE there is an O.Z. support for installation before or after pulling wire.

BECAUSE the serrated O. Z. liner provides a *positive* grip when plug is wedged home.

BECAUSE you can choose from three basic types the *best* support for your job—

1. **CONDUIT TYPE** for fast, easy installation on vertical runs. Screws directly on conduit. Malleable iron body grooved for tightening with screwdriver.
2. **LOCK TYPE** for use in *any* position. Threaded collar pressing against plug assures vibration-proof support under all conditions.
3. **SPLIT TYPE** for quick changeover jobs where cable is already installed. Body halves placed around cable, steel band fastened, and assembly placed on top of conduit.

There are thousands of O. Z. products designed to help you put power where you want it, and your O. Z. distributor is the man to see about them. Send for illustrated catalog.

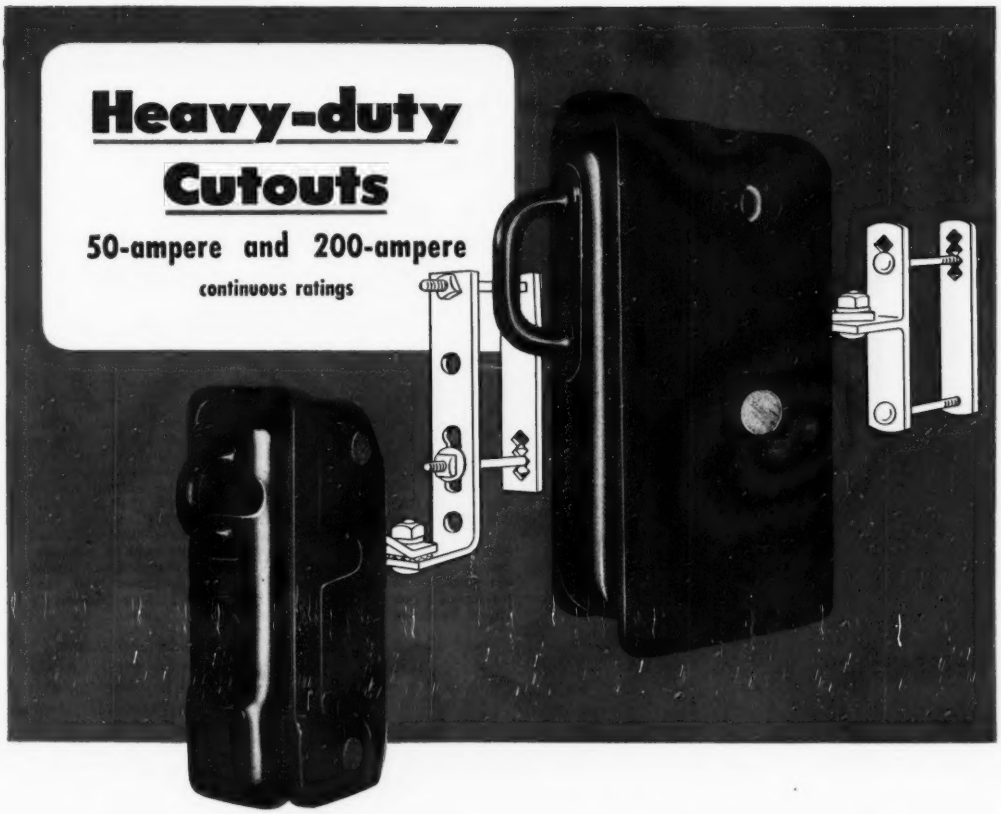
5305

And Remember—They're O. K. If They're O. Z.

CONDUIT FITTINGS • CABLE TERMINATORS • CAST IRON BOXES
GROUNDING DEVICES • SOLDERLESS CONNECTORS • POWER CONNECTORS

O.Z. ELECTRICAL MANUFACTURING COMPANY, INC.

262 BOND STREET · BROOKLYN 2, N. Y.



. . . both having 8000-RMS-ampere interrupting capacity

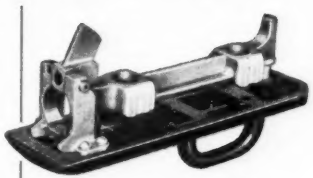
Here are two heavy-duty enclosed indicating fuse cutouts for high power capacity distribution feeders. They have interrupting ratings of 5000-rms amperes at 5000 volts (or line-to-neutral of 8330-volt grounded wye systems) and 8000-rms amperes at 2500 volts (or line-to-neutral of 4160- or 4330-volt grounded wye systems).

Cutout shown on the left is the new heavy-duty 50-ampere unit —for all who want *high interrupting capacity* without paying for unneeded high continuous current rating.

Cutout shown on the right is the standard heavy-duty 200-ampere indicating unit incorporating recent improvements in door and swivel hanger support.

Both units have housings of wet-process porcelain, glazed inside and out, with hanger support cemented into back—doors of molded Textolite, compound—and fuseholder tubes of laminated linen-base Textolite and fiber, easily replaced and with exceptional resistance to both weathering and arcs—and both have spring-operated indicator arm to pull cable downward and completely out of tube —assuring quick interruption even at low currents.

For details and prices ask for Bulletins GEA-3688 and -5019. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



400-AMPERE DISCONNECTING BLADE FOR 200-AMPERE CUTOUT

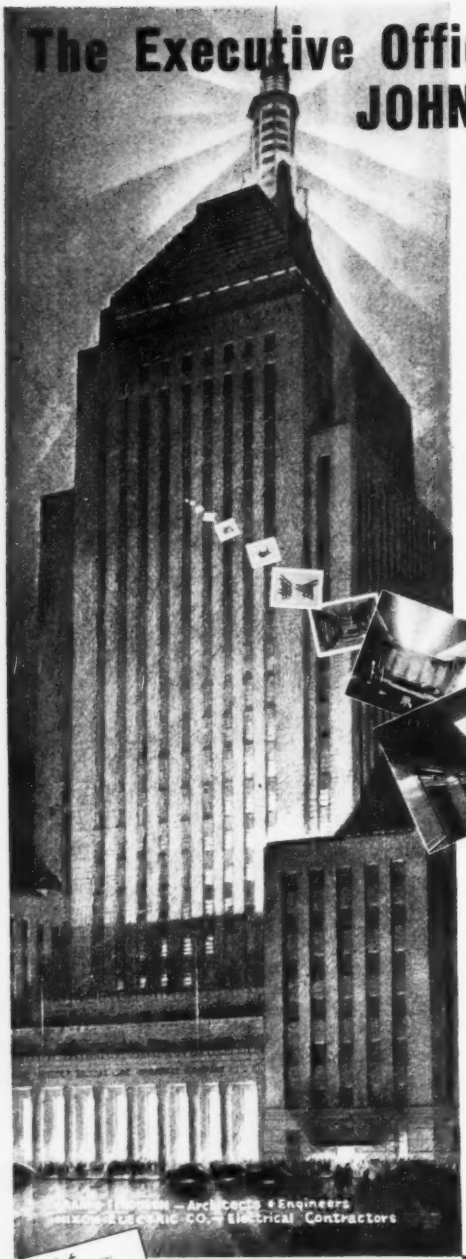
Simply by changing the door, the 200-ampere fuse cutout can be converted to a 400-ampere disconnecting cutout. This unique disconnect door can be closed, with the hinged blade in open and completely isolated position to give positive indication that the circuit is open.

GENERAL ELECTRIC

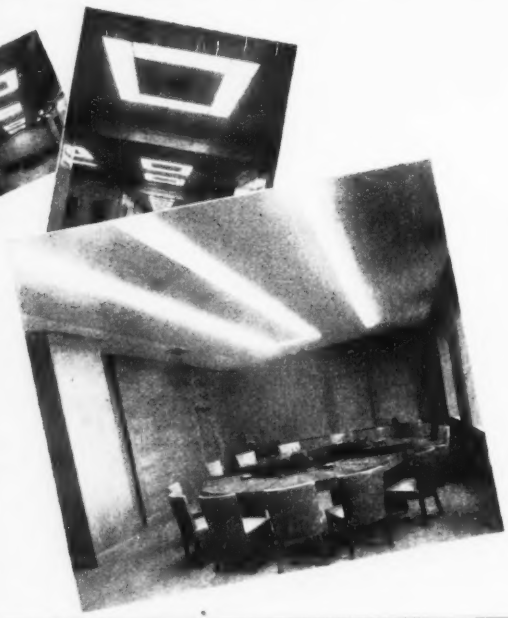
4195-26

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

The Executive Offices of the New JOHN HANCOCK BUILDING ARE LIGHTED BY Smithcraft TROFFERS



Smithcraft Troffers (with Albalite glass) were chosen for the entire executive floor of the new John Hancock Building in Boston. Pattern lighting was required . . . and Smithcraft Troffers were selected because they permit complete freedom of lighting "expression" by the architect — without use of special or expensive accessories. Smithcraft Troffers effectively cut down the usual time and cost of installing recessed fixtures, because only Smithcraft provides the patented Aligner Hanger, cushioned Glass Frame, captive reflector fasteners, as well as unexcelled light distribution. These are features of importance to architect, engineer and contractor . . . features that make Smithcraft Troffers "America's Finest Recessed Lighting Fixture".



There's a 20-page booklet "Architectural Troffers" that tells you why Smithcraft Troffers are being specified for more and more outstanding installations throughout the country. Send for your copy today.

Smithcraft
LIGHTING DIVISION
CHELSEA 50, MASSACHUSETTS

A STORY IN TWO PARTS . . . PART I

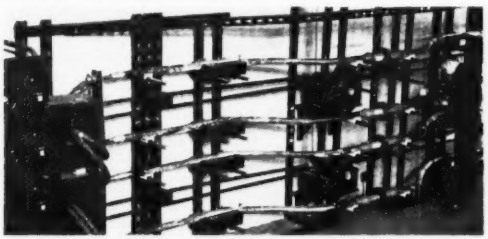
HOW OKOMETAL of reduced thickness PLUS OKOSHEATH Protective Covering

...provides 6 major advantages to paper cable users

*** A story so important that it will be developed in two successive issues of this magazine.**

Okometal of reduced thickness plus Okosheath Protective Covering is the latest improvement in paper cable sheathing produced by Okonite-Callender Research Laboratories. The result of long, intensive study and testing, it is a composite sheath of alloyed lead protected by a tough, reinforced neoprene covering vulcanized and firmly bonded to the lead. This dual sheath provides *six major advantages* to a growing list of users. Here are three of the advantages you get with Okometal-Okosheath cable construction:

Doubled Cable Life Expectancy: Dummy manhole-bending machine tests show that Okometal — a lead alloy developed by the Okonite-Callender Research Laboratories — doubles service life expectancy through increased resistance to bending fatigue at joint offsets in manholes. This doubled resistance permits the use of reduced lead thicknesses up to one-third less than standard when the Okosheath Protective Covering is employed.



DUMMY MANHOLE TEST: Completed cables with joints, trained to standard contours are subjected to ½" movement at 4-minute cycles at actual operating temperatures. In this, and similar power company tests, 270 bending cycles are equal to about 1 year actual service. Cables with Okometal-Okosheath Protective Covering outlast plain lead-covered cables 2⅔ to 1.

Elimination of Corrosion: For over 15 years our Okosheath Protective Covering has been used by power companies to eliminate chemical, electrolytic and galvanic corrosion of lead sheaths. There is no recorded instance where lead sheath corrosion has occurred in cables protected by Okosheath. Extensive laboratory, field and service tests yield convincing evidence of its complete resistance to corrosion.

Reduced Installation and Maintenance Costs: In addition to reducing the number of manholes and joints through lighter weight and a lower co-efficient of friction, this Okometal-Okosheath combination promotes further economies through eliminating the costly practice of grading and flushing duct lines. Longer cable life and doubled resistance to failure also contribute to reduced maintenance costs.

• • •

In the next issue of this magazine we will discuss these remaining important advantages of Okometal-Okosheath cable construction:

GREATER BURSTING STRENGTH • PREVENTION OF LEAD SCORING
EASIER PULLING

Meanwhile, comparative test results, explanatory photographs and diagrams, as well as more detailed information of this important development are available in Research Publication 110. Write for your copy on your business letterhead. The Okonite Company, Passaic, N. J.

Compare this substantial dual construction with plain lead of same core diameter.

Okonite-Callender cables with this composite sheath meet all AEIC Test requirements for paper cables with plain lead of standard thickness.

7033

OKONITE-CALLENDER paper insulated power cables

Johns-Manville Announces Two New

Smooth layers of Quinterra Type 6 Electrical Insulation (Twin-ply), used in winding a dry-type transformer

Quinterra

TYPE 6 (TWIN-PLY)

A new cost-reducing, high-temperature insulation that prolongs transformer life many times through its resistance to pyrolysis

Here is a radically new asbestos-base, continuous-sheet, paper-like electrical insulation that offers many economies. It is primarily intended for interlayer and wrapper insulation in windings and coils used in Class A and B transformers (internal hot-spot temperatures 130C, or higher if special varnishes are employed).

Quinterra Type 6 is plied at the factory by welding two layers of Quinterra and calendering them into a dense, strong and smooth-surfaced insulation having good tensile and bursting strengths. For economical application with a minimum of waste, Quinterra Type 6 is furnished in continuous rolls cut to exact widths.

Excellent handling properties

Uniformity of physical and handling properties enables assemblers to achieve production rates such as are attained with the best types of interlayer and wrapper insulations. Further economies result from the large square-foot-per-dollar coverage.

Excellent constructional advantages

The plied construction of Quinterra Type 6 offers two distinct constructional advantages: (1) It provides better dielectric protection than a single layer. (2) Under stress, the weaving strains within coil structures are less likely to damage a plied insulation than a single-layer insulation.

Excellent dielectric-thermal characteristics

The base sheets of all Quinterra products are made 100% inorganic, but, for mechanical reasons only, are saturated with an organic resin. At room temperature (ASTM conditions) Quinterra Type 6 averages in excess of 350 VPM. After prolonged exposure at 175C, long after the thermoplastic saturant is driven off, it still maintains its original dielectric strength and requires only the re-establishment of its varnish protection to provide a further useful life cycle.

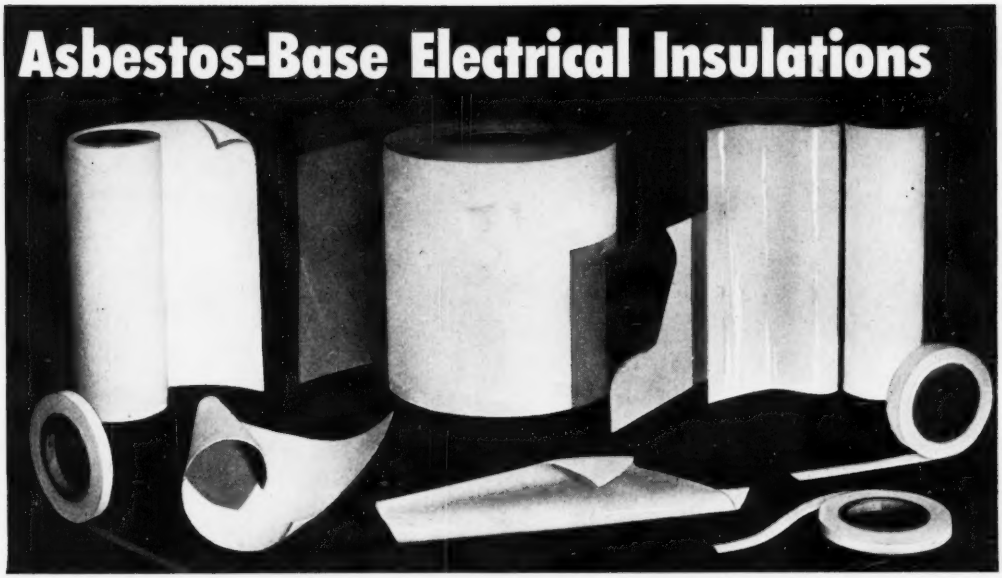
We will be glad to provide you with samples and further information about Quinterra Type 6 Electrical Insulation. Write Johns-Manville, Box 290, New York 16, N. Y.

Weights and thicknesses of Quinterra Type 6

Thickness ± 10%	Weight Per 100 sq ft ± 15%	Approx Coverage sq ft lb
.0045"	2.5	40
.006"	3.3	33
.007"	3.8	26
.008"	4.5	22
.009"	4.8	20
.010"	5.5	18
.012"	6.2	16
.015"	7.2	14

Johns-Manville

Asbestos-Base Electrical Insulations



A variety of types of electrical insulations as produced by combining glass, mica, and organic papers and films with Quinorgo #3000 or #4000.

Quinorgo

#3000 AND #4000

New, economical, high-temperature insulations with a previously unattainable combination of dielectric and mechanical properties

Quinorgo #3000 and Quinorgo #4000 are two new insulations developed by Johns-Manville. Each can be used alone or in combination with other dielectrics. In the latter use they can be either treated or coated with insulating varnishes, or combined with organic or inorganic electrical insulating sheets or films.

Quinorgo insulations contain 80% or more of specially processed asbestos fiber, the remainder being selected organic fibers and binders. The two types differ in that the organic portion of Quinorgo #4000 contains a small amount (3% or less) of resin not present in Quinorgo #3000. The resin slightly reduces absorption and penetration.

These highly improved forms of asbestos electrical insulations have extreme uniformity of texture and caliper (from .005" to .015"). They are furnished in continuous rolls, in tapes of exact widths and in sheets cut to size.

Excellent for compactness — Quinorgo #3000 and #4000 have important advantages where asbestos papers previously could not be used because they were too thick, their dielectric too low, or strength inadequate.

Excellent for "composites" — Quinorgo #4000, because of its heat resistance, closed nonwoven structure, uniform thickness and special penetration characteristics, is ideal for use in composite insulations.

For example, it may be coated on one surface with shellac or varnish to permit bonding or cementing to it such mechanically or dielectrically stronger materials as inorganic woven cloths and mica or organic cellulose films or sheets. The opposite surface remains ready for absorption of treating varnishes used in the further processing of equipment after the composite insulation has been applied.

Excellent for economies—Quinorgo #3000 and #4000 may be economically substituted for quality grade organic or inorganic layer insulation. When varnish-protected in apparatus, they will perform indefinitely because of their high asbestos content. (Hot-spot temperatures to 130C).

We will be glad to provide you with samples and further information about Quinorgo insulations. Write Johns-Manville, Box 290, New York 16, N. Y.

General average properties of Quinorgo #3000 and #4000

Thickness	Lbs Per 100 sq ft	1" wide Longitudo T.S. lbs	Dielec Min VPM
	3000-4000	3000-4000	3000-4000
.005"	1.5 1.7	14 15	300
.007"	2.2 2.5	18 19	300
.010"	3.3 4.0	20 21	250
.015"	4.7 5.7	26 28	200

Electrical Insulations

JOHNS-MANVILLE JM PRODUCTS

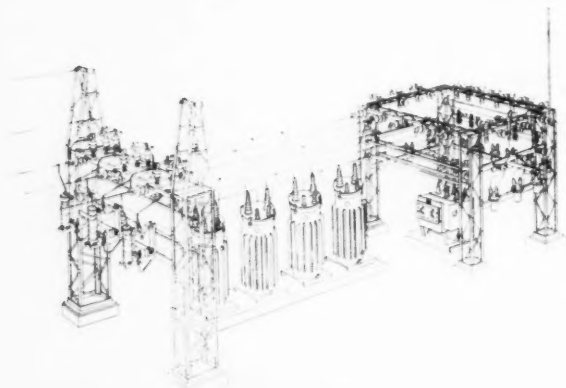
PRODUCT NEWS

Maintenance Equipment For Public Utilities

(1100, 1101) J. H. Holan Corp., 1100 W. 150th St., Cleveland 11, Ohio

Two new items for public utility maintenance work include a low-cost aerial ladder and a hydraulic tower. The former, (1100) pictured above, left and center, is adaptable to any standard service body, with or without high roof enclosure. Instead of rotating, the ladder can be extended either forward or to the right side of body. In working forward, there is one locked position; in working to right side, there are four locked positions. When the ladder is not in use, an adjustable frame used for securing ladder in side position can be folded against side of body to give a clear working bed. Three models are available, with maximum extended height from ground of 22, 24 and 26 ft.; with platform heights of 19, 21 and 23 ft. respectively.

The tower, (1101) right above, rises from a collapsed height of 10 ft., 3 in., to 30 ft.; is available with three types of platform: S (stationary); R (rotary); and T (transverse). Motion of the tower is electrically controlled. Controls may be located on platform, at rear of truck or in chassis cab. Model 1315 has two sections, can be raised to height of 17 ft.; model 1320 has three sections, 23-ft., 6-in. maximum height; model 1330, four sections, 30-ft. maximum height. Combinations of platforms and heights are possible.



Packaged Substation For Rural Use

(1102) General Electric Co., Schenectady 5, N. Y.

These ready-to-install substations for rural systems are available in any one of four basic arrangements. Fabricated steel structure, transformers, switchgear, lightning arresters, all components, necessary hardware, erection diagrams and drawings are included. Ratings range from 300 to 1,500 kva., 22,000 to 69,000 volts (incoming), 12,470Y/7,200 or 13,200/7,620 volts (outgoing). "Building block" design permits capacity to be added or removed in easily handled blocks of power.

AVAILABLE SOON

. . . reserve your copy now

BTC's new catalog of Drop Forged Hi-Line Hardware will soon be coming off the press. The first edition to appear since the war, it contains valuable information you'll want to have on hand for ready reference—pictures, blueprints and complete specifications on BTC's entire line of Drop Forged Steel, Aluminum and Bronze Hi-Line Hardware.

This 40-page BTC catalog will be sent to you without charge by the company that pioneered the first and only full line of standard drop forged high-line hardware. Simply fill in and mail the coupon below — but do it now, so that your copy can be mailed when it's ready.

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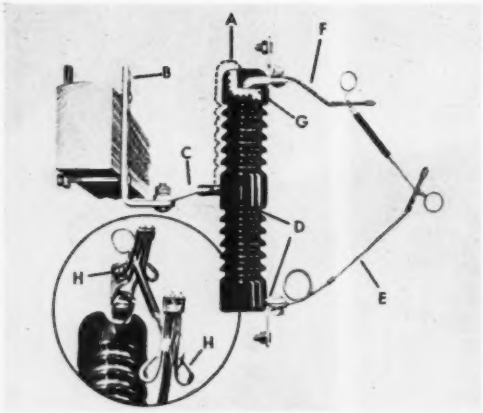


(A) greater leakage distance; (B) NEMA standard cross-arm hanger; (C) adjustable mounting bracket; (D) cemented inserts; (E) heavy-gage Copperweld lower contact arm; (F) extra-long upper contact arm; (G) cutaway to show recessing of insert (H) high-pressure wedge-type contacts

Open Link Cutout

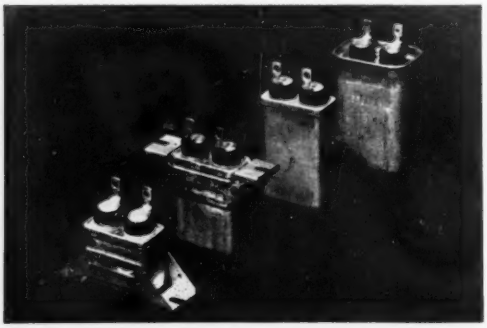
(1103) S&C Electric Co., 4425 Ravenswood Ave., Chicago 40, Ill.

This new cutout is made in ratings of 7,500 and 15,000 volts, 50 amp. Greater leakage and flashover distances are secured by recessing the end inserts and by cementing-in and locating all inserts so that live parts are on the opposite side of the insulator from the adjustment mounting bracket. According to the manufacturer, this also makes the unit animal and bird proof. Wet and dry flashover values average 40% greater than NEMA standards for this class of equipment, it is stated. Another feature is the improved wedge-type contact with long uniform grooves to assure a high pressure grip on the fuse link cable and preclude high contact resistance or radio interference.

Small D-C Capacitors

(1104) General Electric Co., Schenectady 5, N. Y.

For use in ambient temperatures up to 125° centigrade, these Permafil d-c paper-dielectric capacitors require no derating for temperatures up to 100° centigrade, the manufacturer states. Hermetically sealed in metallic containers, they are available in case styles 61, 63, 65 and 70, as covered by joint Army-Navy specifications, in ratings of 0.10 to 10.0 muf 600-, 1,000-, and 1,500-volts. All types have permanently sealed silicone bushings.



Fractional Horsepower Speed Control

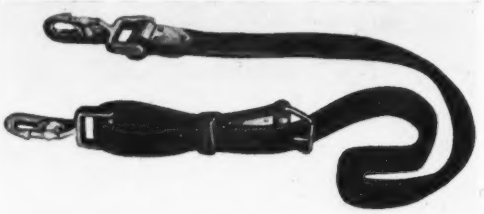
(1105) Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

A new fractional horsepower Mot-O-Trol electronic adjustable-speed drive starts, stops and controls speeds of 1/8- to 1/2-hp. d-c motors, operated from single-phase, 50/60-cycle, 220/440-volt power sources. It uses armature control to allow a speed range of 20 to 1 at constant torque. Dynamic braking, overload and low-voltage protection are provided. Separate field rheostats and linestarters are not required.

Air Circuit Breaker

(1106) Roller-Smith Division, Realty and Industrial Corp., Bethlehem, Pa.

The RS air circuit breaker was developed to protect feeder circuits and for use as main circuit breakers on medium-capacity systems. They are available in 15,000 and 25,000 rms. amp. interrupting rating capacity. The continuous-current carrying capacity ranges from 15 to 225 amp. for the RS-15 breaker and from 35 to 600 amp. for the RS-25 breaker. Potential ratings for both are 250 volts d-c and 600 volts a-c. These breakers are available for manual or electrical operation.



Nylon Safety Strap

(1107) Buckingham Mfg. Co., Binghamton, N. Y.

Multiple plies of nylon, specially woven from high-tensile fibers, are laid together in neoprene and vulcanized, to make this strap. Stronger than harness leather, nylon is said to give extreme resistance to abrasion. Even in severe cold, the strap keeps its flexibility, according to the manufacturer.

Externally Operated Switch

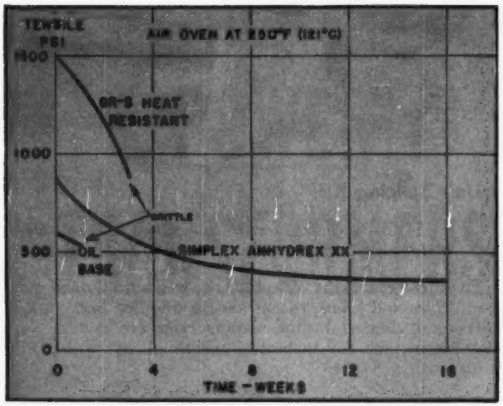
(1108) General Switch Corp., 45 Roebling St., Brooklyn 11, N. Y.

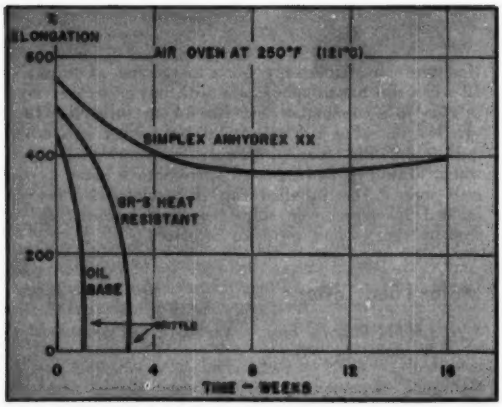
This device was designed primarily for outdoor use on buildings requiring a 30-amp. capacity service entrance switch in combination with four plug fuse branch circuits. Two styles are available, R33NP4 with two main plug fuses and R33NU4 without provision for main fuses. Both types have a 1-in. hub.

The raintight cabinet protects the interior mechanism. Access door for branch circuit lighting fuses provides dead front. The dead front cover is hinged at the top and provides for holding the cover in open position.

AGED AT 250°F

. . . YET THE NEW ANHYDREX XX PROVES ITSELF "TOPS" AMONG HIGH-VOLTAGE INSULATIONS!





Yes, at 250 F., and after SIXTEEN weeks of constant exposure to this grueling temperature the new Anhydrex XX insulation was still rubber-like in quality and appearance; still suitable for continued use. It had retained approximately half of its tensile strength, nearly two-thirds its elongation. **And after the first few weeks the rate of deterioration was very slight,** indicating exceptional stability and long life.

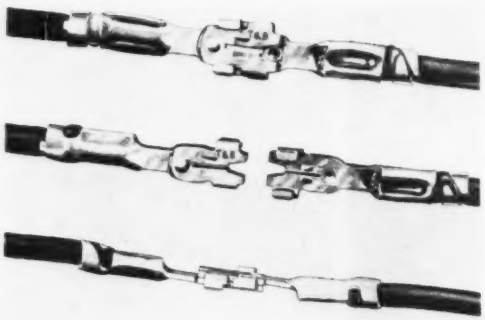
Conventional oil base and GR-S heat-resistant compounds undergoing the same test could not match its performance. At the end of only one week the oil base compound had completely lost its rubber-like characteristics. Two weeks later the GR-S compound followed suit. Both had become brittle and, upon bending, immediately cracked and crumbled.

After aging for 7 days under the same high temperature, Anhydrex XX was immersed for a week in distilled water at 70 C. (158 F.) yet would not absorb more than 15 mg. per square inch of exposed surface. It was exposed to .03% ozone for four hours yet would not crack when bent.

Yes, Anhydrex XX is the only high-voltage insulation that combines low water absorption with long life, ozone resistance and heat resistance. It is your assurance of low-cost, uninterrupted service under all operating conditions. For complete data, write us today for Specification 1685.

SIMPLEX—WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



Wristlock Disconnect

(1109) The Thomas & Betts Co., Elizabeth, N. J.

Consisting of two identical halves that can be meshed and locked together by hand, this disconnect (B-23) was designed for use with relays, signal or elevator equipment, many types of fractional horsepower motors, or devices that are demountable or are used where connecting or disconnecting may be expected. The manufacturer claims that it will not let go in line of pull and cannot swivel out of connection. It is Underwriters' approved for installation with the T&B WT-110M hand tool or 21070G air-powered bench tool. Once installed it can be disconnected by pushing each half toward the other and can be reassembled at will, the manufacturer states.

Wood Strain Insulator

(1110) Hubbard and Co., Pittsburgh 1, Pa.

Four-way action is secured with this new insulator design. As tension is applied, interlocking plates start moving forward. As they move slightly, the inclined planes under the heads and nuts of the assembly bolts cause a simultaneous motion inward, 90° to the line of pull and on all four sides of the wood member. In older designs, the squeeze was applied transversely in two opposing directions only, which resulted, under excessive pull, in a crushing and "flowing" of the wood fibers until a limit was reached and the wood sheared out ahead of the bolts.

The 4-way design allows no relief area into which the wood can "flow." Fittings therefore develop a higher percentage of the fiber strength of the wood, according to the manufacturer. Even under excessive tension, the assembly bolts through the wood do not bear against the wood itself. Pressure on the wood is transmitted through the plates, the bolts "floating" in the wood in slots provided.

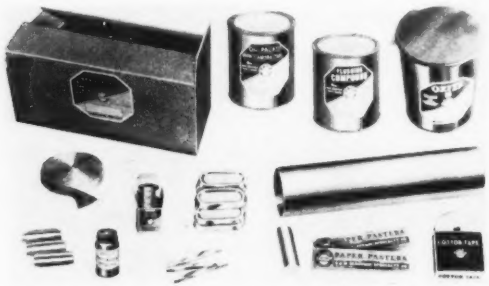
Another feature claimed is the almost complete enclosure of the wood by the plates which make up the fittings. This is said to prevent end-checking of the wood over long periods of service.

Standard assembly consists of one sheave wheel and one clevis end. All wood sections are Douglas fir, treated with Pentachlorophenol.

New Type Beam Clamp

(1111) Minerallac Electric Co., 25 N. Peoria St., Chicago, Ill.

This clamp is said to eliminate the necessity for drilling holes to mount hangers to I-beams. It is made of heavy-gage zinc plated steel, with deep drawn ribs for added strength without weight. It has $\frac{1}{4}$-20 tapped holes and will fit beam flanges up to $\frac{1}{2}$ in. thick. The clamps were designed for use with the company's No. 0 to 6 hangers.



Unit Splicing Kits

(1112) G & W Electric Specialty Co., 7780 Dante Ave., Chicago 19, Ill.

These cable splicing kits are unit packaged for all types of cables and joints, except gas- or oil-filled high voltage. Features claimed by the manufacturer are saving in installation time and materials, and simplicity of determining costs.

Insulated Splice Caps

(1113) Buchanan Electrical Products Corp., 1290 Central Ave., Hillside, N. J.

Heretofore available only for a maximum of three No. 12 wires, Buchanan splice caps with insulators now come in sizes to accommodate five No. 14, or three No. 12 to two No. 6. Splice cap is installed by means of a crimping tool with four uniformly converging plungers, which draw cap and inserted wires into a solid, permanent mass. The installed cap is insulated by pushing molded insulator over splice cap and turning up red security ring to lock insulator in place.

Motor Load Tester

(1114) Wagner Electric Corp., 6282 Plymouth Ave., St. Louis 14, Mo.

Hydraulic dynamometer SA-434 has 30- to 300-ft.-lb. capacity for load testing large electric motors. It is placed directly on the test floor and is raised to desired height with jack screws. Adapters for eight motor shaft sizes from $1\frac{1}{8}$ to $2\frac{7}{8}$ in. are furnished. Wagner recently announced the SA-433 dynamometer for load testing motors with shaft diameters up to and including one inch. Both models are built to order only, for delivery in approximately 60 days.

HERE ARE ALL THE FACTS ON RM* POWER TRANSFORMERS

*Certain G-E power transformers, within the complete G-E line, have for a number of years been designated as "repetitive manufacture," or "RM" for short. These are standard transformers that lend themselves to quantity production.

Through quantity production RM transformers can be built faster, at lower cost. Engineering and drafting for any particular transformer is already done; component parts can be mass-produced; jigs and fixtures are already on hand.

As a result, RM transformers can be delivered months sooner than non-RM transformers. Their prices are lower, by at least eight per cent, than specials of identical ratings.

"RM" transformers are available in ratings of 667 to 5000 kva, single-phase, and 750 to 10,000 kva, three-phase and with high voltages in accordance with EEI-NEMA preferred voltage ratings between 2400 and 67,000 volts. They are equipped with the most popular types of terminals and accessories.

A NEW 44 page catalog gives you

Prices • Ratings

Electrical and mechanical data

Application and selection data

Lists and descriptions of basic accessories and optional features

If you haven't received your copy of GEC-479, call your local G-E office or write *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

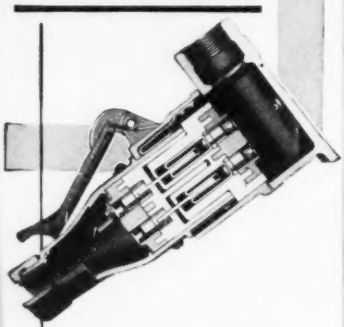
GENERAL ELECTRIC

691-7

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

QUELARC

The Circuit Breaking Plugs and Receptacles . . . Ratings Up to 200 AMPERES



The exclusive QuelArc construction provides exceptional protection to contacts, for safe use as current rupturing devices. Unique partitioned insulation provides extra long distance between contacts and between contacts and ground. Insulating chambers completely enclose all contacts and form an arc-trapping space. Galvanized cast metal housings, bakelite insulation and individually renewable contacts insure long service life.

QuelArc plugs and receptacles are available in a complete range of styles, 2, 3 and 4 pole types—grounded through shell or extra pole. Housings with threaded cap, plain cap or hinged spring door. Ratings 20, 30, 60, 100 and 200 amperes, 250 volts DC, 600 volts AC. Consult your Pylet Catalog 1100, Bul. 1140-2 for complete listings.

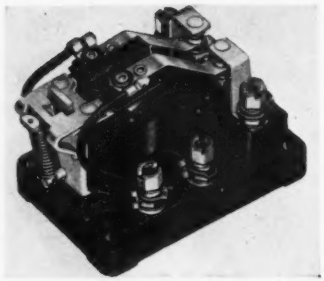
CONDUIT FITTINGS • FLOODLIGHTS

THE PYLE-NATIONAL COMPANY

SINCE 1897

1364 N. Kostner Ave., Chicago 51, Ill.

Pacific Coast Sales Office
25 Beale Street, San Francisco 6, Calif.

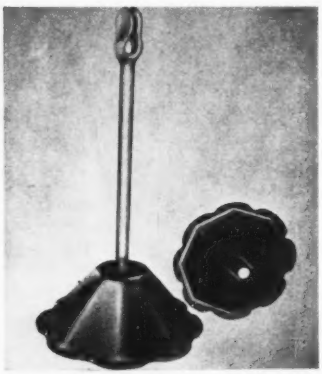


(1115) The Ward Leonard Bulletin 110 multi-pole midget magnetic relay was designed for general- and special-purpose control. Coils are available for operation on all standard voltages and frequencies up to 115 volts a-c or d-c. Non inductive ratings for n.o. and n.c. contacts are 10 amp., 24 volts d-c or 115 volts a-c, 60 cycles. Ward Leonard Elecrtic Co., Mount Vernon, N. Y.

Electrical Tape

(1116) Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

A new 20-ft. roll of Scotch brand tape No. 33 is described as a "job-size roll." This plastic-backed tape provides insulation and abrasion resistance in a single taping operation. It is rated by Underwriters' for temperatures up to 176°F; is 7 mils thick with dielectric strength of more than 7,000 volts.



Cone Anchor

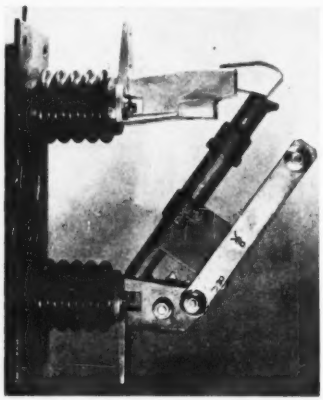
(1117) A. B. Chance Co., Centralia, Mo.

This 8-way steel cone anchor is formed of drop forged steel; is claimed to cut cost of guying in hardpan, adobe clay or rocky soil, but to have same holding strength as cast cones. It is designed for use with a tamped rock fill; has eight flat faces that wedge against the fill. A flaring base supports the rock at the bottom of the hole, increasing effectiveness of the wedge. A nut retainer locks the anchor securely to the rod to facilitate installation. Anchor comes in 8-, 10-, 12- and 16-in. diameter.

Indoor Air Interrupter Switch

(1118) Electrical Engineers Equipment Co., Melrose Park, Ill.

This switch has an interrupter tube containing an arcing chamber and operating on the deionizing principle. When the switch is fully closed, the interrupter tube is not in circuit. But when the switch starts to open by pulling on the operating handle, the interrupter unit is brought into circuit along a follower horn before the line

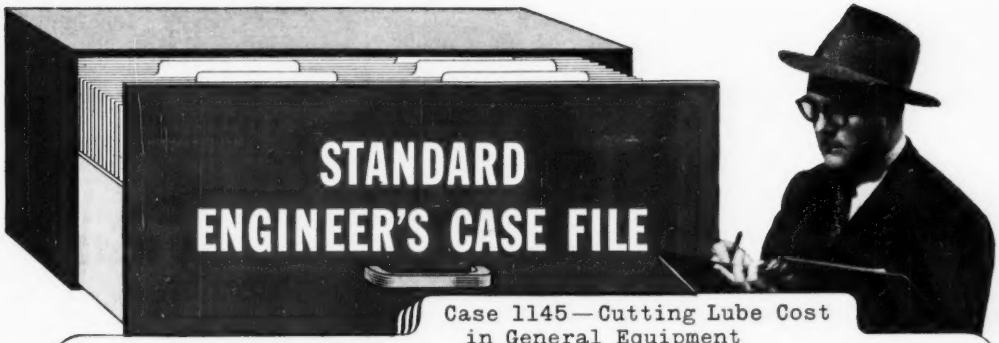


contacts part. As soon as the main contacts part the current is shunted through the interrupter tube.

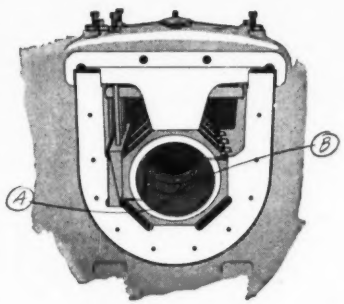
At about the position indicated in the picture, the interrupter unit is tripped and a spring pulls the arcing rod through the arcing chamber at high-speed, putting out the arc. Whatever gases are generated are forced out the vents at the top of the tube.

According to the manufacturer, this switch is satisfactory to break its full-rated current of 600 amp. up to and including 15,000-volt rating.

(1119) These varnished cambric cables are made in all standard sizes, constructions and voltage classifications to 15,000 volts. They meet requirements of both IPCEA and Underwriters' Laboratories. Manufactured by Rockbestos Products Corp., New Haven, 4, Conn.



Case 1145—Cutting Lube Cost in General Equipment



AIR COMPRESSOR MAIN BEARING

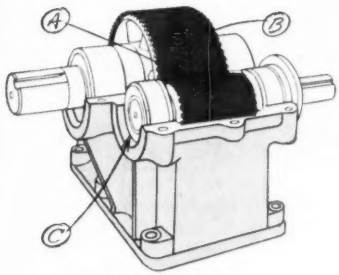
Calol Multi-Service Oils in air compressors decreased lubricant consumption as much as 20%. Highly efficient in many machines, including Diesel engines, pumps, enclosed reduction gears and their integral bearings. Come in six grades: 45X, 50X, 55X, 65X, 75X, 85X. Approximately SAE 10 to SAE 50.

A. Contain oxidation-resistant compounds ... prevent formation of varnish and lacquer on bearing surfaces, engine cylinders, pistons, etc.

B. Special compound assures lubrication at high temperatures — has inherent tendency to "run toward" hot surfaces ... spreads uniformly and rapidly.

Other additives in Calol Multi-Service Oils help remove lacquer and varnish from machine parts and keep them dispersed, and prevent excessive foaming of oil. May be used in all types of oiling systems.

Case 1143—Preventing Scuffing and Galling of Enclosed Gears



ENCLOSED REDUCTION GEAR

The teeth of industrial enclosed reduction gears, lubricated with Calol Gear Compound, remained in good condition even when operating under the heaviest shock loads. Calol Gear Compound is recommended for both single and double enclosed reduction gears where load conditions are severe. Comes in 8 grades to meet a wide range of conditions: Nos. 60, 100, 120, 135, 150, 190, 225, and 410. (Numbers designate viscosities at 210° F.)

A. Contains extreme pressure compounds — will not pound or squeeze off . . . reduces wear, cushions shocks and promotes gear efficiency.

B. Resists oxidation, conducts heat readily and helps cool gears, bearings, etc.

C. Foam inhibitor prevents building up of pressure in gear cases and reduces leakage.

Trademark Reg. U. S. Pat. Office

STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush St., San Francisco 20, California.

CALOL

FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

BE *Penny-wise* DON'T BE *Pound-foolish*

"PENNIES for OHIO MOTOR BRUSHES" MEANS DOLLAR SAVINGS IN MOTOR MAINTENANCE AND PERFORMANCE

The most important part of a motor or generator is the brush. Properly designed brushes, will give you proper commutation, **increase** motor efficiency and performance and will **minimize** maintenance costs. OHIO Brushes represent a tiny **investment** that pays giant **dividends.**

CHECK CATEGORY, CLIP COUPON, SIGN AND MAIL TO DEPT. 5

OHIO CARBON CO.,
12508 Berea Rd., Cleveland 11, Ohio

Gentlemen: We are interested in the following types of motor brushes—

☐ INDUSTRIAL ☐ GENERAL PURPOSE ☐ MINING
☐ WELDING ☐ REFRIGERATION ☐ APPLIANCES
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ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

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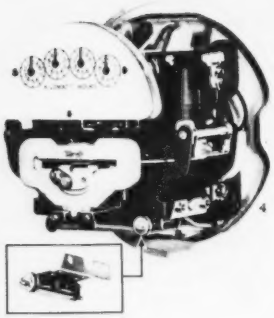


Polyphase Meter

(1120) Sangamo Electric Co., Springfield, Ill.

A micrometer adjustment for power factor compensation is a feature of the improved type LC polyphase watthour meter. The micrometer adjustment comprises a slide held in comprehensive contact with a slider mounted on a threaded shaft. The slider moves when the shaft, with slotted end, is rotated with a screwdriver. Position of the slider on shaft fixes compensation within close limits.

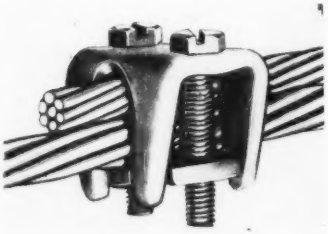
The slider and slide wire are gold plated to insure positive contact in service. The slotted adjustment shaft is accessible from the front.

Provision for photoelectric testing has been incorporated. This change in design includes addition of a circular hole 0.07 in. in diameter, near the edge of the disk, to give a vertical clear path for the light beam.

Round Cross Arm Gain

(1122) Malleable Iron Fittings Co., Branford, Conn.

The Px 115 gain was designed for supporting round arms on H-frame structures; is claimed to be in effect both support and transition piece between arm and pole. It will accommodate arms from 6½ to 12½ in. diameter. Regardless of arm size, through bolt can be placed through diametric center. Forward side of gain gives broad shelf on which arm bears; pole side has long heel with wide bearing surface on which are four spurs.



Small 2-Bolt Connector

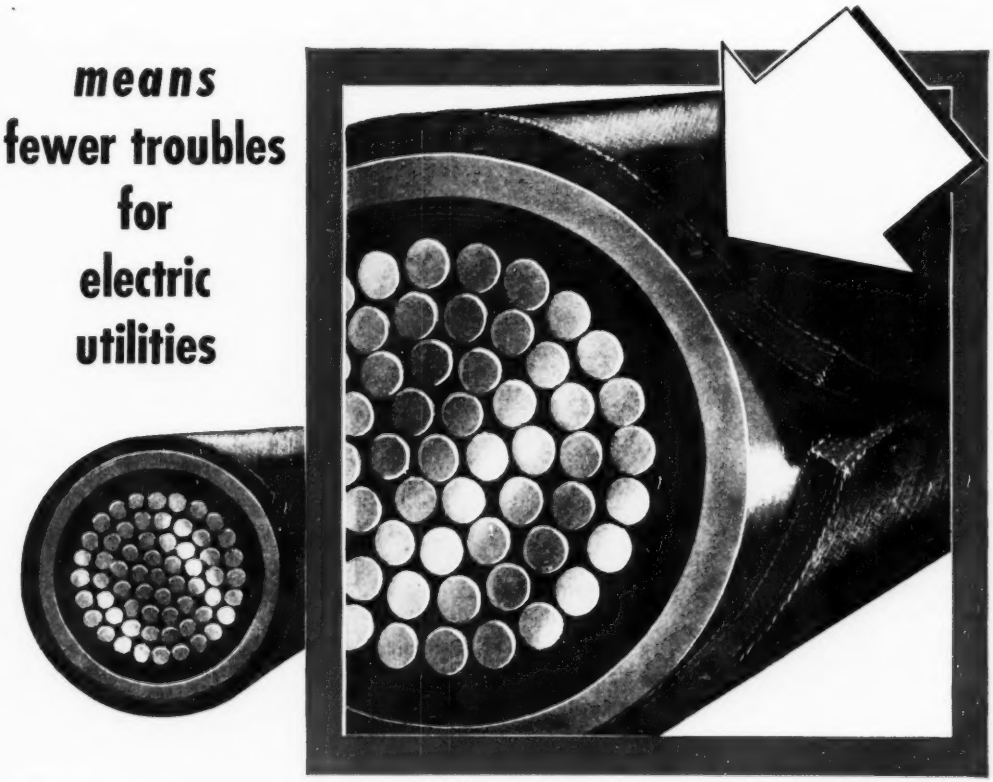
(1123) W. N. Matthews Corp., 3850 Delor St., St. Louis 16, Mo.

The 642 Uniclamp is claimed to make the same type and caliber of connections on conductors as small as 6 solid as formerly have been possible on conductors of 1 0 and above. This new connector is cold forged of copper; is available with or without spacer bars and is applicable to the making of copper-to-copper; copper-to-aluminum; aluminum-to-aluminum connections.

(1121) Two of these heavy-duty line construction trucks will be used by USBR on Parker Dam project in California. Of all-steel construction, the bodies have built-in, 4-man crew compartments. They are 199 in. long, 96 in. wide, 77 in. high. Weathertight compartments are fitted with shelves, trays, parts bins and material hooks. Three hot-stick compartments are provided on the right side of body. Units are equipped with 18-lb.-capacity power winches and derricks capable of handling poles up to 80 ft. Long. Of standard Powers series 600-C type, bodies were built by McCabe-Powers Auto Body Co., 5800 N. Broadway, St. Louis, Mo.; are mounted on special Oshkosh chassis

This glass-reinforced neoprene jacket

means fewer troubles for electric utilities



To prevent corrosion and to reduce the possibility of mechanical damage to underground power cables, both during and after installation, General Electric now offers a new, improved type of jacket, available on leaded cables installed in ducts, directly buried, or for aerial service.

Corrosion-proof glass tape and tough, age-defying neoprene are combined in this new jacket to provide an effective defense against moisture, soil acids and alkalies, and electrolytic corrosion—to take the hard knocks and mechanical abuses that occur during installation. Composed of spiral-wrapped, permanently strong glass tapes, coated and impregnated with a neoprene compound, thoroughly bonded and vulcanized together to form a tough, homogeneous mass—this newly-designed jacket gives the protection under rugged service conditions that utilities have been seeking for years. At the same time, the use of glass tapes permits a substantial reduction in the thickness of the jacket and of the lead sheath, resulting in a reduction in weight and diameter, and easier pulling during installation.

You can have all the advantages of this new jacket on your next job. It can be furnished, at your request, on all General Electric lead-covered cables, including gas- or oil-filled cables, used by utilities. For further information, call your General Electric Construction Materials district office, or write to Section W48-1125, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

GENERAL ELECTRIC

(1124) STARTERS—A new line of manually operated starters for a-c motors up to 7½ hp. is designed for use on farm machinery, textile looms and small pumps, blowers and grinders. Come in both toggle and push-button types in 2-, 3- and 4-pole forms, size 0 and 1. General Electric Co., Schenectady 5, N. Y.

(1125) REDRAW ROD—Coiled aluminum redraw rod, ⅜ in. diameter, is offered in two alloys, EC and 61S. Available in 150 lb. coils (48 in. O.D., 36 in. I.D.) with rod diameter tolerances plus or minus 1/64 in. Reynolds Metals Co., Louisville, Ky.

(1126) WALL BOX—Combines an auxiliary circuit breaker, convenience outlet and pilot light, according to the manufacturer. Electrical apparatus plugged into the outlet is protected by the magnetic circuit breaker against overloads and short circuits; pilot light is a reminder that circuit is in use. Standard ratings: 115 volts, 6, 10, 15 amp.; 230 volts, 6, 10 amp. Other ratings to 50 amp. Heinemann Electric Co., 121 Plum St., Trenton, N. J.

(1127) CONNECTOR—The "H" universal size porcelain connector has new internal construction; is available for various combinations of all stranded or all solid wire or a mixture. Holub Industries, Sycamore, Ill.

(1128) SWITCHGEAR—Redesign of outdoor type, vertical-lift, metal clad switchgear to give better protection against weather, improve ventilation and increase accessibility and safety features has been announced by Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

(1129) CONNECTOR—A small-size porcelain wire connector, model E-1, is designed for joining wires up to four No. 18, particularly in production wiring. Inside of skirt is threaded from one end of connector to other; these same threads hold the insulation up inside the connector so that stripped wire ends are covered. Ideal Industries Inc., Sycamore, Ill.

(1130) PANELETTE—A 12- to 20-circuit MO panelette wih plug-in circuit breaker units is available for 3- or 4-wire service. Underwriters' approved for service entrance applications where circuit breaker mains are required or with lugs only mains. Incorporates thermal-magnetic circuit breaker units that plug-in on cylindrical bus bars and are interchangeable with those of the NMO panelboard. Square D Co., 6060 Rivard St., Detroit, 11, Mich.

(1131) PANEL INSTRUMENTS — New 3½-in., long-scale instruments of internal-pivot-type construction are designated as types DO-81 (direct current), DO-82 (thermocouple) and DO-83 (rectifier); employs standard 3½-in. round and square cases with 250° scales 4.92 in. long. General Electric Co., Schenectady 5, N. Y.

(1132) MOTORS—CSP Life-Line motors, designed for deep-well turbine pumps, can be furnished as a complete motor, a motor without base or as a stator and rotor only. They are of the squirrel cage induction type. Come 1 to 20 hp.; 60, 50, 25 cycles; 208, 220, 440, 550 volts; frame sizes 225 to 326. Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa.

how GOOD can PLANNED LIGHTING be without good equipment?

THE answer is—no better than a building plan without good building material. There is no dodging the fact that Good Equipment is the BASIC factor in a GOOD LIGHTING PLAN. It is the lighting units, the lampholders, the ballasts, the reflector, etc., which MAKE or BREAK the final results, in terms of sustained lighting efficiency, low-cost maintenance and dependable operation.

That's why, no matter how good the Lighting Plan, the results may be disappointing unless the plan includes GOOD EQUIPMENT.

the PUBLIC must be BETTER INFORMED on the importance of GOOD lighting equipment

As an industry, and as individual business men, we fail in selling PLANNED LIGHTING when we do not sell the importance of GOOD EQUIPMENT at the same time. It is our obligation that we keep faith with our customers by giving them the UNVARNISHED FACTS about the DIFFERENCE between GOOD and INFERIOR or SUBSTANDARD EQUIPMENT in terms of the factors listed below.

The buyer is entitled to KNOW these facts and to be TOLD and SHOWN that there are POSITIVE PROTECTIONS provided by the lighting industry, which assure him that the equipment he buys is in the GOOD EQUIPMENT BRACKET . . . the QUALITY BRACKET. *Proof of Quality* in lighting equipment is MADE EASY through such proof elements as:

CERTIFIED BALLAST LABEL

RLM LABEL

UNDERWRITERS' LABORATORIES LABEL

ELECTRICAL TESTING LABORATORY TESTS

These provide the buyer not only with the assurance that MINIMUM STANDARDS for performance have been met, but also that UNIFORM QUALITY is continuously maintained from one piece of equipment to the other.

FREE Booklet . . . The RLM Standards Institute has published a booklet containing the detail of each specification for each type of lighting unit for which RLM Standards have been established, as well as a complete summary of the IMPORTANCE OF THE LABEL in terms of CUSTOMER BENEFITS.

How the RLM Label provides assurance that the equipment is of uniformly high quality is shown through an outline of the RLM CONFORMANCE PROGRAM. Under this program, the Electrical Testing Laboratories make periodic tests of samples obtained from factory or market place to make sure that all equipment bearing the RLM Label consistently and continuously adheres to RLM Standards.

Make the RLM BOOKLET a part of every Planned LIGHTING PROPOSAL! . . . Write to the RLM Standards Institute for your COMPLIMENTARY COPY (or copies) of the RLM SPECIFICATION BOOKLET *today*. Plan to attach a copy to every PLANNED LIGHTING proposal you submit . . . let it help you point out to your customers that GOOD EQUIPMENT is BASIC to GOOD PLANNED LIGHTING.

the PUBLIC is entitled to KNOW these FACTS about GOOD LIGHTING EQUIPMENT

CONSTRUCTION: Good Lighting Equipment features structurally sound fabrication and heavy steels for maximum resistance to sag, distortion and breakage.

FINISH: Good Lighting Equipment features reflector finishes that insure your getting all the light you pay for . . . this year and ten years from now! That is why good equipment so overwhelmingly features PORCELAIN ENAMEL—the one and only commercially available finish that cannot deteriorate or corrode, regardless of the industrial atmosphere. Additional advantages of Porcelain Enamel are (1) that it is the only finish whose original efficiency can be sustained year after year by simply washing it with soap and water, and (2) that it is UNSURPASSED as a reflecting surface, because it ideally combines a high reflection factor with a high diffusion factor, insuring high light output with a minimum of glare.

REFLECTOR DESIGN: Good Lighting Equipment insures good lighting through reflector design that conforms to the most accepted principles of Illuminating Engineering. Such design protects the workers' eyes while delivering, not only the *most light* per dollar, but also the *required quality of light* for the individual Seeing Task.

SOCKETS, STARTERS, LAMPHOLDERS: Good Lighting Equipment features ruggedly constructed parts that withstand years of use and embody special design which facilitates quick, money-saving maintenance and low-cost operation.

BALLASTS: Good Lighting Equipment insures you against trouble by employing only the highest quality certified ballasts. Ballasts last longer because sound electrical and mechanical design prevents high temperature ballast operations. Lamps last longer because certified ballasts supply proper starting current and maintain proper operating watts to the lamp. Present wiring capacity is used most efficiently by the high power factor of quality ballasts.

This Advertisement is published in the Interest of the Entire Lighting Industry by

RLM STANDARDS INSTITUTE
INCORPORATED

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

RLM STANDARDS INSTITUTE, SUITE 815, 326 W. MADISON ST., CHICAGO 6, ILL.

Ad SR-3487

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If you know linemen, you know they want the finest in quality when it comes to equipment. Not only does their job depend on it—many times their lives do.

It is the reputation of nearly a century in designing and manufacturing the finest in linemen's equipment that has won Klein its position of preference with linemen and electricians everywhere.

It is easy to make equipment that looks like Kleins. It takes years of experience plus extensive manufacturing facilities to make equipment that performs like Kleins.

Today you are assured prompt delivery on all Klein products. Be sure your pliers, climber straps, safety belts and other items carry the Klein trade-mark—famous for quality "since 1857."

ASK YOUR SUPPLIER
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International Standard Electric Corp., New York

The Klein Pocket Tool Guide showing the Klein line and containing useful tool information will be mailed on request.

Mathias KLEIN & Sons
Established 1857 **Chicago, Ill., U.S.A.**
3200 BELMONT AVENUE CHICAGO 18 ILLINOIS

(1133) STARTER Available in both FS and COP types, this starter will operate either 85- or 100-watt F lamps. Sylvania Electric Products Inc., 500 Fifth Ave., New York 18, N. Y.

(1134) CABLE CUTTER This portable hand-operated tool employs a downward circular cutting principle that gives a slicing, rather than a pinching, action. A snap-action hold down feature permits size adjustments to be made with the finger. Beverly Shear Mfg. Co., 3001 W. 111th St., Chicago, Ill.

(1135) SADDLE The Chance cross arm wire tong saddle was designed for use with wire tongs on underbuilt arms when working space is limited or crowded with pole saddles. Pivoting action of the saddle swivel and pole clamp attachment provides a universal joint action said to allow complete freedom of movement of the wire tong in any direction without binding. A. B. Chance Co., Centralia, Mo.

(1136) HANGING-TYPE TRANSFORMERS A new line of narrow (4⅞ and 4⅝) 30-ma. luminous-tube transformers for window and other indoor applications is available with 7,500, 9,000, 12,000 and 15,000 secondary voltages. Jefferson Electric Co., Bellwood, Ill.

(1137) TUBING The new BH 649 Fiberglas tubing and sleeving is toughened against abrasion, does not support combustion, can be knotted and pulled tight without cracking or change in dielectric strength, according to the manufacturer's announcement. Made by Bentley, Harris Mfg. Co., Conshohocken, Pa.

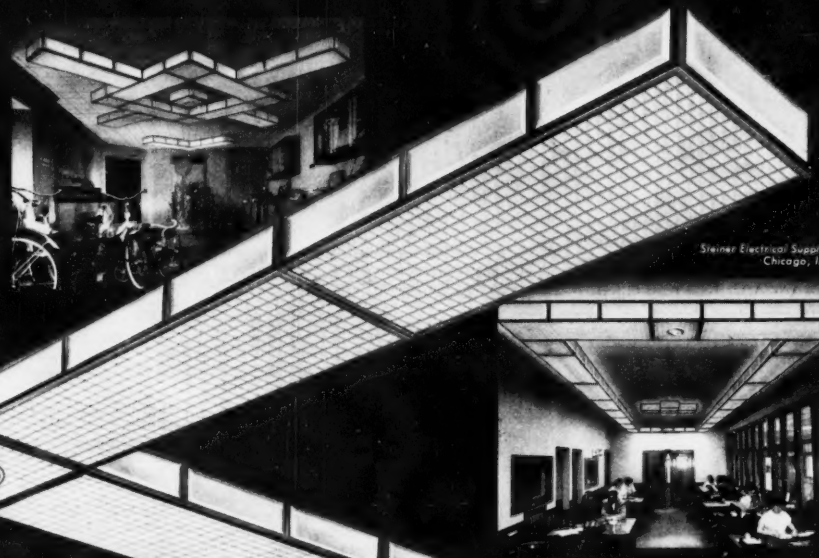
(1138) WELDER A small, low-cost arc welder, operating off a 110-volt circuit is available from Lincoln Electric Co., Cleveland 1, Ohio; is said to have design and operating characteristics of larger industrial welders. With a maximum output of 60 amps., the Lincwelder 60 can be used for a variety of light-gage metal working jobs and for joining material such as strap, pipe, tubing, angle and other shapes.

(1139) WIRE Numbers instead of color coding is used on this wire for electric controls. Each wire has its code number imprinted in bright red on every inch of the yellow insulation. Called "Magic Wire," it is manufactured by Midwest Automatic Control Co., 510 Third St., Des Moines, Iowa.

(1140) BUSHINGS Designed for use on hermetically sealed transformers and condensers, these bushings incorporate a neoprene rubber gland between two pieces of steatite. Twenty-five sizes and designs available from Heldor Bushing & Terminal Co., 60 Park Place, Newark 2, N. J.

(1141) BATTERY CHARGER The KX Charge-O-Matic for electric industrial trucks is a fully automatic motor-generator type, single-circuit battery charger requiring no base, bench or stand. It is said to charge one lead-acid battery in eight hours or less and one nickel-alkaline battery in seven hours or less. Available from Hertner Electric Co.

(1142) INSULATED CLIPS—Rubber insulated clips, clamps and fasteners are available in a variety of shapes and sizes from Automotive Rubber Co., 8601 Epworth Blvd., Detroit 4, Mich.



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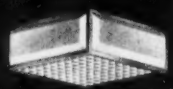
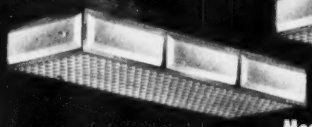
never before possible! custom-designed lighting installations at mass-production prices!

MODULE lighting is here . . . a truly revolutionary idea that heralds a dynamic new era in commercial lighting. Four low-cost "building blocks of light" easily fit together mechanically and electrically . . . end to side, end to center, end to end, or side to side. Now, you can economically fulfill specialized needs with an infinite variety of harmonious, functional lighting patterns that fit all architectural requirements. MODULE is truly *superior* lighting—providing an abundance of glare-free illumination with exceptionally low surface brightness. Ingeniously engineered plastic louvers and side panels provide scientifically correct shielding and eliminate unsightly dark spots.

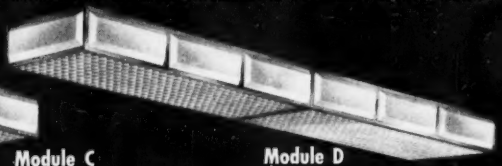
Write today for FREE 20-page MODULE booklet which fully explains and illustrates the unlimited possibilities of this modern lighting miracle.



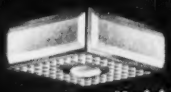
Module A
Four 14-watt T-12
15" type F lamps



Module C
Four 40-watt T-12
48" type F lamps



Module D
Four 75-watt T-12 425
milliamp Slimline lamps



Module B
One 32-watt 12" Circline
lamp, and one Par Spot
or Floodlamp

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MARKERS • YARN • LUGS • MICA • RODS
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SLOT WEDGES • CARBON BRUSHES
BALL BEARINGS • SLEEVE BEARINGS
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BULLETINS ETC.

(1143) GAGES—A bulletin on the new series 500 absolute-pressure gages has been published by The Bristol Co., Waterbury 91, Conn.

(1144) CONNECTOR — A laboratory and switchboard connector bulletin is available from Cannon Electric Development Co., Catalog Department, 3209 Humboldt St., Los Angeles 31, Calif.

(1145) PLANTS—Stand-by power plants are described on catalog sheet 449-SB, issued by Kato Engineering Co., Mankato, Minn.

(1146) PYROMETER — Type 1200 portable multi-circuit pyrometer is described in a bulletin offered by Illinois Testing Laboratories, 420 N. LaSalle St., Chicago 10, Ill.

(1147) RELAYS—A 12-page relay catalog, No. D-20A is available from Ward Leonard Electric Co., Mount Vernon, N. Y.

(1148) BALLASTS—Fluorescent and slimline lamp ballasts are listed in catalog leaflet 449-FL published by Jefferson Electric Co., Bellwood, Ill.

(1149) HEATING—Types of heating units for the farm are described in a 10-page booklet prepared by Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa.

(1150) AIR CONDITIONERS — Packaged units for a variety of applications are presented in a series issued by General Electric Co., Bloomfield, N. J.

(1151) SWITCHBOARDS—Special power control equipment is treated in Catalog PL-100 published by Taller & Cooper, 75 Front St., Brooklyn 1, N. Y. It is loose leaf bound so that special equipment and application sheets may be inserted as issued.

(1152) INDOOR CURRENT TRANSFORMERS—R. E. Uptegraff Mfg. Co., Scottdale, Pa., describes its type CR indoor current transformer in a recent bulletin.

(1153) LIGHTING—A 40-page "Quick Reference" catalog has been issued by Benjamin Electric Mfg. Co., Des Plaines, Ill.

(1154) FLOOD LIGHTS—A 46-page catalog describing and illustrating more than 100 Red Cap flood lights and reflectors is offered by S & M Lamp Co., 119 W. 36th Pl., Los Angeles.

(1155) CUSTOM LIGHTING — Booklets for architects, lighting engineers and electrical contractors have been prepared by Federal Enterprises, Lighting Division, 225 N. Michigan Ave., Chicago, Ill. Federal is now strictly a custom lighting manufacturer.

(1156) OUTDOOR LIGHTING — A 4-page folder describes Glo-Rite-Lites, manufactured by Oscar Phillips Co., 2918 Vine St., Cincinnati 19, Ohio.

(1157) MAINTENANCE — Commutator and Slip Ring maintenance is the subject of a booklet prepared by Ideal Industries Inc., Sycamore, Ill., for maintenance men and engineers.

(1158) FITTINGS — Solderless connectors, cable and conduit fitting and wiring devices are listed in a recent publication of Buchanan Electrical Products Corp., 1290 Central Ave., Hillside, N. J.

(1159) RECORDER — Design improvements and new applications for the Bailey combustibles recorder are listed in a 16-page bulletin being distributed by Bailey Meter Co., Cleveland 10, Ohio.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

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1109	1110	1111	1112	1113	1114	1115	1116	1117
1118	1119	1120	1121	1122	1123	1124	1125	1126
1127	1128	1129	1130	1131	1132	1133	1134	1135
1136	1137	1138	1139	1140	1141	1142	1143	1144
1145	1146	1147	1148	1149	1150	1151	1152	1153
1154	1155	1156	1157	1158	1159			

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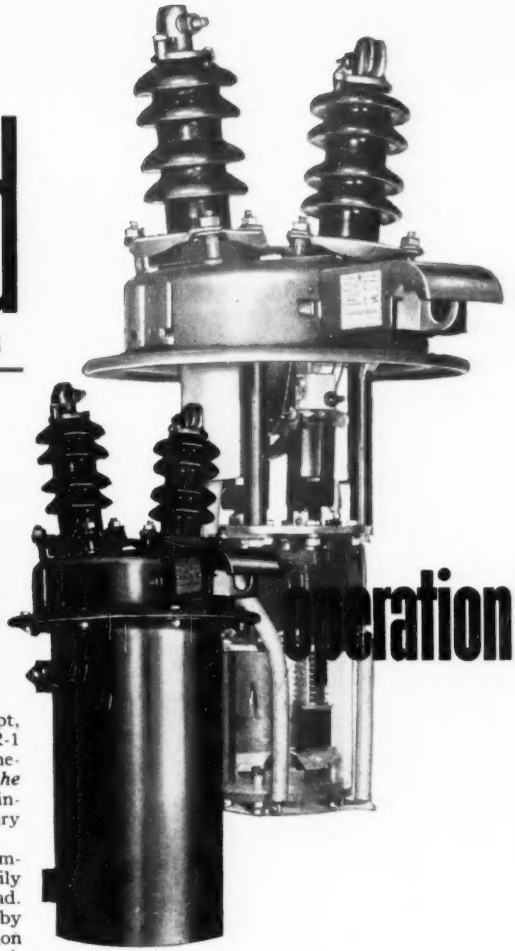
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Hold-Closed

till the right fuse blows



a new concept in recloser operation!

G-E invites you to consider a different concept, the alternate operating function built into the FR-1 Recloser. Suppose a recloser, after its two instantaneous openings, HOLDS CLOSED *but only until the right fuse blows*—then automatically resets for instantaneous openings—ready to again clear temporary faults. What then?

FIRST— Fewer reclosers would be needed for complete protection. Where reclosers would ordinarily be required, you could use co-ordinating fuses instead.

SECOND— Fewer consumers would be affected by permanent faults, because the "hold-closed" function lets you use more co-ordinating fuses. You can break up a feeder into five, six or even more sections, each protected by a progressively smaller fuse. When the recloser holds-closed, it *forces* the *right fuse* to clear a permanent fault, thus confining outages to smaller areas.

THIRD— You can pick up the load after an outage without by-passing the recloser. No need to worry about inrush and motor starting currents because the recloser can't lock open—it holds closed, picks up the load, then automatically resets to normal position.

General Electric believes that on rural lines, this "hold-closed" function is the answer to lower cost protection, fewer outages per consumer and faster service restoration. Therefore, its new recloser, the FR-1, has been designed to embody this exclusive "hold-closed" function. Conversion from conventional operating function to "hold-closed" function can be made in the field. With this "hold-closed" function, the recloser opens twice instantaneously, each opening followed by a 1-second reclosing. This clears non-persistent fault without damage to fuses. If the fault is persistent, the recloser then *holds closed*—but only long enough for the fuse to blow and clear the fault—whereupon the recloser quickly resets, ready to go again.

The FR-1 recloser can also be used with the conventional operating function—two instantaneous openings, plus two time-delay openings, to lock open. Because the time-delay openings are controlled by a highly accurate mechanical-escapement timer, operating in air, the FR-1 is not affected by temperature or condition of oil—thus permitting *reliable* year-round co-ordination with more ratings of fuses than any other conventional lock-open type of recloser. Because the FR-1 resets 5 times faster it gives more protection.

For the full story on the new "hold-closed" function, including complete application information, write for Bulletin GER-131. *Apparatus Department, General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

608-21

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

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ELECTRIC MFG. CO. CHICAGO, U.S.A.
THE GREATEST NAME IN LIGHTING

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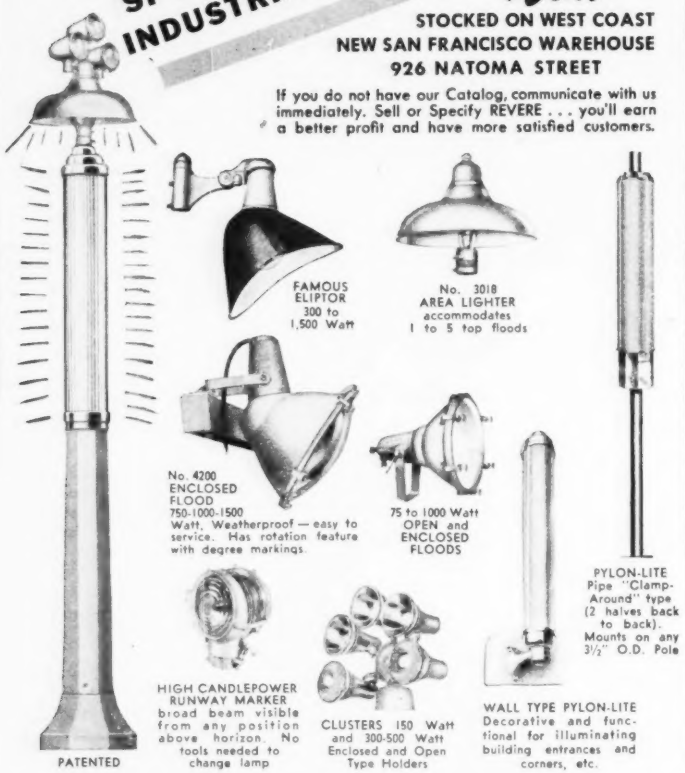
FAMOUS ELIPTOR
300 to 1,500 Watt
No. 3018 AREA LIGHTER
accommodates 1 to 5 top floods
No. 4200 ENCLOSED FLOOD
750-1000-1500 Watt. Weatherproof — easy to service. Has rotation feature with degree markings.
75 to 1000 Watt OPEN and ENCLOSED FLOODS
PYLON-LITE
Pipe "Clamp-Around" type (2 halves back to back). Mounts on any 3½" O.D. Pole
HIGH CANDLEPOWER RUNWAY MARKER
broad beam visible from any position above horizon. No tools needed to change lamp
CLUSTERS 150 Watt and 300-500 Watt Enclosed and Open Type Holders
WALL TYPE PYLON-LITE
Decorative and functional for illuminating building entrances and corners, etc.
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ELECTRICAL BOOKS

THE STORY OF BIG CREEK by David H. Redinger. 182 pages, 6x9. Angelus Press, Los Angeles. $2.50. Dave Redinger started on the Big Creek construction job in 1912 as a transitman and for the next 35 years his hand, his knowledge and his personality made themselves felt in almost every step of that great project. His story is more than an epic of construction and engineering. He takes the reader behind the scenes and regales him with the humorous and human sides of the job. Whatever one's interest may be in the story of power development, there is much in this volume to add to his enjoyment. If it's people, there are anecdotes about John Eastwood, A. G. and Emory Wishon, Russ Ballard, John B. Miller and Herb Barre. If it's transportation and construction equipment, the book traces the transition from mule, horse, Irish baby-buggy and muck stick, to trucks and cats, mucking machines and jumbos and finally to sno-cats and helicopters. Dave Redinger has set down a lively record of one of the West's great engineering jobs. We regret that other big projects did not have their Redingers to do the same.

ELECTRICAL TRANSMISSION OF POWER AND SIGNALS, by Edward W. Kimbark. 460 pages, 6x9. John Wiley & Sons. $6. Presents the basis theory of transmission lines together with applications to the three fields of power, telephony, and ultra-high frequencies. Theory is given in three main parts: transmission-line parameters, steady-state phenomena, and transient phenomena. Parameters of transmission lines, including simple 2-wire lines and coaxial cables, multiconductor lines, ground-return lines, standard conductors and skin effects are thoroughly discussed. Contains transmission line (hyperbolic function) charts and tables and graphs of the characteristics of power-line conductors, power transmission lines and distribution lines, telephone lines and cables, submarine telegraph cables and radio-frequency lines.

A PROFESSIONAL GUIDE FOR JUNIOR ENGINEERS, by William E. Wickenden, as edited and collated by G. Ross Henninger. 55 pages, 8½x11. Engineers' Council for Professional Development, 29 West 39th St., New York. $1. A guide for the professional life of the young engineer. Presents the philosophy and engineering ethics a young engineer needs for success as viewed by Dr. Wickenden. Traces the engineering profession through its every aspect, what the young engineer can expect to find, the difference between a trade and a profession, and professional relationships.

THE EFFECT OF HIGHER INCOME TAXES ON ELECTRIC UTILITY ENTERPRISES, by Herbert B. Dorau and J. Rhoads Foster. 104 pages, 8½x11, paper. EcoStat Research Inc., Ridgewood, N. J.. $2.50. A report, prepared at the request of the EEI, NAEC and AEIC, on the impact of higher income taxes on utility operations with particular reference to the ability of the companies to finance present and future expansion. Particularly valuable because of the diversity and completeness of the statistical analyses of taxes and financing.

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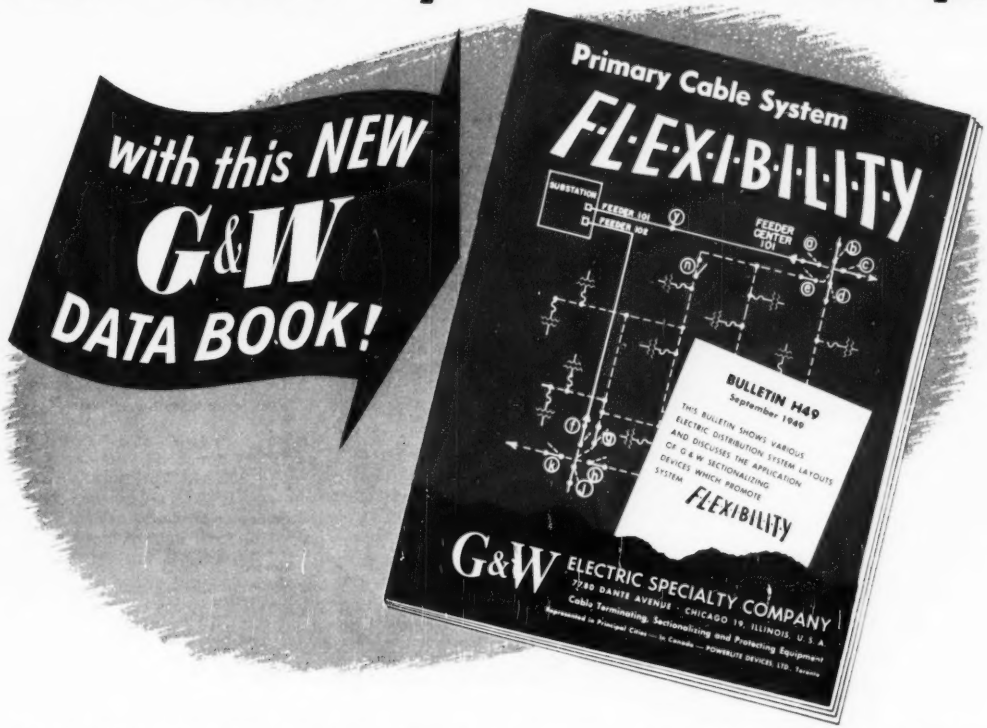
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ELECTRA'S HUSBAND

LOTS of people in this business who do not get to go to a convention wonder a bit about what those who do go get out of it or what the convention gets out of them. Oh, sure, they come back with yarns about what a fine time they had. Some rare ones even can tell some of the things they learned from the meetings or committees or, even better, the "bull sessions" up in somebody's room where they got the "low-down" on this or that. But in this day and age of polls and surveys, of questionnaires and test procedures, it was only to be expected that sooner or later a survey would be turned loose on a convention crowd to poll some opinions from the conferees.

Just that happened at the annual Business Development Section meeting of the Northwest Electric Light & Power Assn. at Salt Lake City in May. Everyone found on the chair he sought to sit on each morning a little folder with a cartoon on its face and a lot of questions inside. Some of them were serious, others seemed frivolous but probably had some sly significance to those psychological savants, the Advertising and Publicity Section habitues. All were asked to answer the questions but *not* sign their names.

Well, herewith are the results, expressed in percentage of those answering each questionnaire, and you can read your own interpretation into them. That's as much fun as doing crossword puzzles and maybe more revealing. But here, read them yourself:

The first day's questionnaire said, We are curious—

1. What is the last thing you usually think about before you go to sleep at night?
   - A misspent life 5%
   - Reddy Kilowatt 9%
   - Tomorrow's work 31%
   - Finances 14%
   - The hereafter 18%
   - The NWEL & P Assn. 5%
   - Golf 0
   - Your kids 31%
   - Your wife 30%
   - What a swell guy you are 0
   - Lana Turner 18%
   - Adequate wiring 0
   - A book 0
2. In these troublesome times, what kind of background training is most needed in decisions in the electric industry?
   - Engineering 9%
   - Finances 0
   - Sales 10%
   - Legal 5%
   - General business 5%
   - Public relations 68%
   - Personnel 14%
   - Political 23%
3. Are you inclined to encourage your own children to find employment in the electric industry, or do you think it better for them to work elsewhere?
   - Would have them work in electric industry 40%
   - Would have them work elsewhere 37%
   - No opinion 14%
   - *No children 9%
4. Do you think a sales department is justified today when merchandising is somewhat retarded?
   - No 5%
   - Sales staff should be increased 54%
   - Sales staff should be maintained as usual 40%
   - No opinion 0

The Answers

Next morning there was this: "Ask me another—

1. Would your trip to this Northwest Electric Light & Power convention be more pleasant if you had your wife along . . . to help find your coat and shoes in the morning?
   - Would like to have her along 33%
   - Do not need her help 9%
   - She could come if she wanted to 41%
   - No opinion (I'm a diplomat) 17%
2. What subjects would you like to have emphasized at this meeting next year?
   - Adequate wiring 33%
   - Home service 9%
   - Public relations 100%
   - Television 33%
   - Advertising 33%
   - Publicity 41%
   - Use of movies 41%
   - Commercial sales 17%
   - Market research 17%
   - Street lighting 17%
   - Sales training 41%
   - Supervisory training 33%
   - Selection of salesmen 9%
   - Power shortage 33%
   - Farm electrification 41%
   - Dealer development 58%
   - Home lighting 33%
3. Do you believe that public relations start with employee relations and, if so, do you keep it in mind?
   - I feel that my employees can be my greatest booster 91%
   - I don't believe my employees have much influence with the public 0
   - I feel that my employees can influence public opinion, but I don't know where to start 9%
4. Do you believe that a comprehensive supervisory training program is essential in the electric industry?
   - The nature of our industry makes a supervisory training program unnecessary 9%
   - We need more and better supervisory programs 88%
   - It's just something else to do 0

Third morning came these, headed, "We'd like to know—"

1. In your opinion do large manufacturers support private enterprise as wholeheartedly as you think they should?
   - Manufacturers give private utilities all they've got 13%
   - Manufacturers try to ride the middle 70%
   - Manufacturers do not support private utilities 13%
   - No opinion 0
2. What is your favorite recreation?
   - Work 27%
   - Golf 8%
   - Reading 13%
   - Gardening 25%
   - Bowling 5%
   - Cooking 0
   - Fishing or hunting 38%
   - Going out with the boys 5%
   - A nip now and then 19%
   - Movies 2%
   - Music 11%
   - Sightseeing 19%
   - *Mountaineering 2%
3. If you had charge of arranging these association meetings, what would you emphasize to make them unbelievably useful and interesting?
   - Cut out dry reports 44%
   - Do more praying 2%
   - Have more discussion groups 25%
   - Have better speakers 17%
   - Try to agree on important objectives 38%
   - Eliminate meetings entirely 0
   - Bring in new faces 13%
   - Bring in more top management 50%
   - Censor the hot air 19%
   - *Mimeograph statistical reports instead of reading, start on time, keep on schedule 5%
4. In your opinion, are we in the electric industry doing the best possible job in our fight to keep government out of private business?
   - We are doing all we can 8%
   - We haven't even begun to fight 67%
   - We are doing a passable job 17%
   - No opinion 0
   - *Need more concentrated effort 2%
   - *Enlist aid of other industries 2%

*Written in by respondent.

As an interesting sidelight, the question as to whether to encourage one's own children to find employment in the electrical industry was asked a large group of employees and the percentage of those who would encourage it was much larger. But the ones who answered these questions at Salt Lake City were executives and semi-executives. That's where the headaches are, no doubt.

Get this Low Cost Oil Protection

IN YOUR NEXT SUBSTATION TRANSFORMER

Sealed Tank Design

SIMPLE . . . PROVEN . . . readily adaptable to lower kva power transformers at *lower cost* . . . these are reasons why Allis-Chalmers Sealed Tank design is recommended for power transformers 34.5 kv and less, 2500 kva and below.

By providing an air-tight seal, atmospheric oxygen and moisture are permanently sealed from transformer oil, thus preserving its dielectric qualities and preventing formation of sludge.

Sealed Tank design is just one of several types of Allis-Chalmers oil protection. Others include the famous *Oil-Sealed* Inert Gas and the *Expansion Tank* methods . . . each designed for greatest effectiveness in its own range and type of application.

For further information on A-C oil protection, or any other phase of Allis-Chalmers quality transformer construction, contact your A-C sales representative. Or write direct. A-2799

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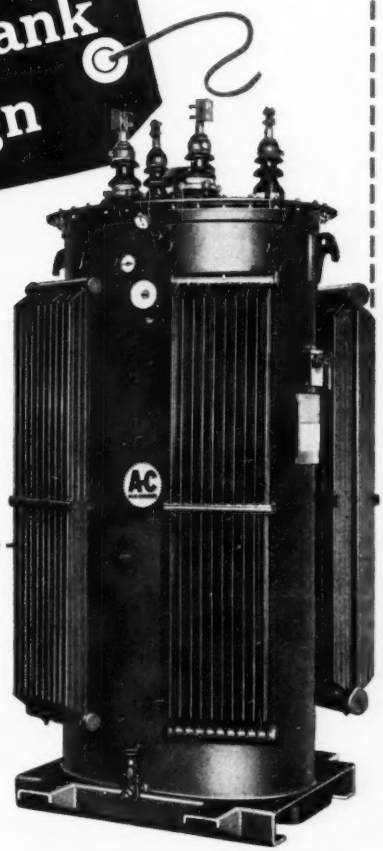


✓ **SIMPLE** . . . . No wearing parts . . . no expensive alarm systems required . . . no replenishment schedule to follow.

✓ **PREVENTS SLUDGE** . . . Filtering requirements are reduced because oxygen and moisture are *positively* sealed out.

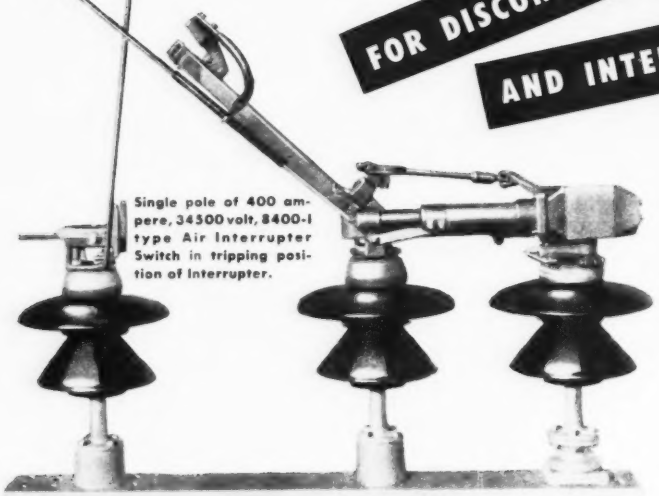
✓ **PREVENTS ACIDITY** . . . Positive moisture seal also prevents formation of harmful acids — helps to preserve transformer insulation.

✓ **LOW OPERATING TEMPERATURE** . . . Cooling ducts are kept open because oil remains sludge-free . . . permits cool, efficient operation of transformer.

ALLIS-CHALMERS A-C ALLIS CHALMERS

3 "E's" DOUBLE DUTY UNIT

FOR DISCONNECTING AND INTERRUPTING



Single pole of 400 ampere, 34500 volt, 8400-I type Air Interrupter Switch in tripping position of interrupter.

INCREASE EFFICIENCY BY INSTALLING THESE TWO FEATURES

The "Three E" Air Interrupter Switches not only provide a highly efficient means of disconnecting and isolating high voltage equipment, but in addition they have interrupting capacity.

The cleverly designed interrupter unit enables this switch to interrupt up to 600 amperes at 46000 volts and up to 200 amperes at 69000 volts.

This unit operates without the use of oil or other outside arc extinguishing mediums and is neat, compact and occupies little space on the main switch.

Because of their greater utility, Air Interrupter Switches can be used for these operations where expensive oil circuit breakers heretofore had been employed.

When you require high voltage switches, why not get the type that gives you the greatest measure of usefulness. **SPECIFY THREE E AIR INTERRUPTER SWITCHES AND GET THE MOST.**

Listed herewith are other operations that can be performed with this type of switch.

1. **Sectionalizing feeder and distribution circuits.**
2. **Interrupting magnetizing current of transformers.**
3. **Interrupting charging current of busses, lines and cables.**
4. **Interrupting exciting current of feeder regulators.**
5. **Switching charging current of capacitor banks.**
6. **Combined with power fuses they present an excellent means of interruption plus fault and short circuit protection.**

Our Bulletin 331 (just off the press) gives complete information on this new type of switch. It is sent gratis.

THREE E — ELECTRICAL ENGINEERS EQUIPMENT CO. — MELROSE PARK, ILL. U.S.A. — THE MARK OF QUALITY

ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

NOVEMBER, 1949 Vol. 103, No. 5

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

MORE WATER IN THE WEST

Alfred M. Cooper

THE most significant economic factor affecting Pacific Coast prosperity is the crying need for water, and yet more water, which today exists in the states of Arizona and California. Even the unusually severe winter of '48-'49 brought but a few inches of moisture to this region. Until recently it appeared that from no source whatever could the Southwest obtain sufficient water to satisfy contemplated industrial, domestic and agricultural needs.

Since the war, however, a new element has been added to this situation. As a result, it now appears that the water problem in California and Arizona *can* be solved satisfactorily for all time to come. Whether or not it will be so solved depends upon the outcome of a controversy which affects every taxpayer in America.

In the past, authorities have generally conceded that Arizona and California already had tapped every conceivable source of additional water supply, either underground or in the form of stream flow. Because of this belief, for 20 years these commonwealths have fought bitterly, each demanding a greater share of Colorado River water. Long ago, however, it became evident that the Colorado and its tributaries could never carry enough water to supply the increasing needs of the great Southwest — an area normally arid, but one which, if furnished with water, becomes enormously productive agriculturally and today also embraces one of the fastest growing industrial areas within the United States.

As of now, California is utilizing 5,362,000 acre-ft. of Colorado River water annually, and Arizona has been allotted 2,800,000 acre-ft. Another 1,200,000 acre-ft. of this water has been granted by treaty to the Republic of Mexico. Adding in every gallon of water now available from all other rivers, wells, and underground sources, neither state has been able to plan intelligently for further growth until gigantic new reservoirs of water have been discovered.

Alfred M. Cooper, widely known consultant, educator and lecturer on industrial relations and employee training, has in recent years devoted much of his time to the problem of water supply in the West. As an engineer and a student of that area's water problems, he speaks with authority on the subject of "More Water in the West"

Where are these vital additional millions of acre-feet of water to come from? There have been two proposed answers to this question: (a) water might be brought 2,000 miles southward to southern California's coastal area through a gigantic aqueduct originating at some point on the Columbia River, or (b) sea water in amounts totaling millions of acre-feet annually can be taken from the Pacific Ocean off California and converted by distillation into sweet, fresh water.

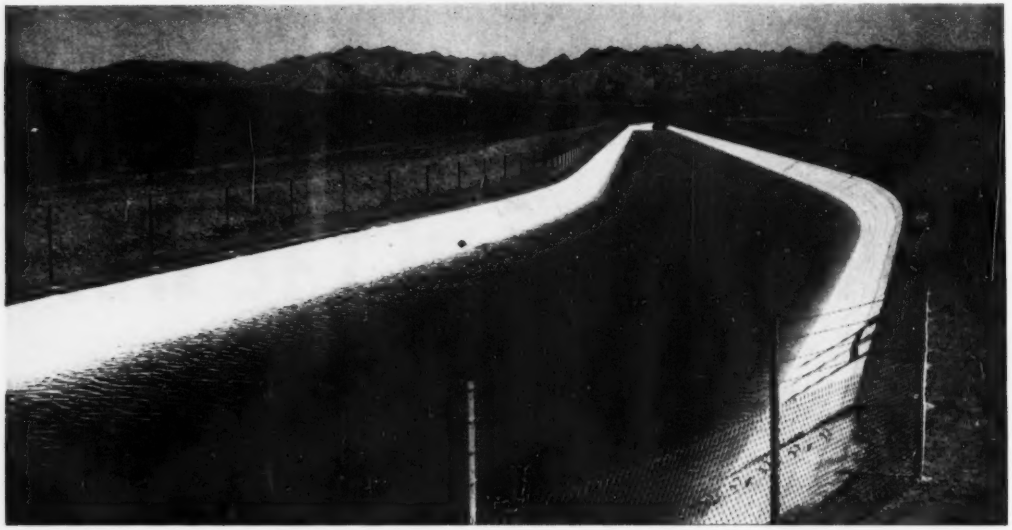
Columbia River Water

Proponents of the proposition to bring Columbia River water down to southern California are to be found principally among those federal agencies which for many years have been engaged in setting up gigantic reclamation and public power "authorities" in various parts of America. The U. S. Bureau of Reclamation already has come up with a truly titantic plan to divert the Columbia River to southern California. Governmental engineers contend that it is altogether feasible to bring Columbia River water to Los Angeles, and as usual their specifications call for virtual federal domination of the economy of the district through which the giant aqueduct would be laid. The water, they say, can be brought directly from a point east of Portland and pumped southward over the 4,500-ft. elevations intervening; or, as an alternative plan, the aqueduct can be brought the long way around at sea level by following the jagged and rockbound Oregon-California shoreline of the Pacific.

Those favoring this gigantic undertaking point out that the Columbia is California's nearest reliable source of unlimited additional fresh water, and further contend that the Oregon-Washington territory drained by the Columbia always receives more inches of rainfall than its farms and industrial centers ever can absorb. The federal agencies also hold up the Metropolitan Aqueduct, which connects southern California cities with the Colorado River, as an example of what can be done in diverting much of the flow of a great river to an urban and agricultural center. These engineers assert that, with 20,000 new permanent residents entering California each month, it is imperative that construction of the Columbia River aqueduct be started at once.

In California, however, there appears to be a noticeable lack of enthusiasm among water authorities for the federal Columbia River aqueduct project. For example, James H. Howard, general counsel for the Metropolitan Water District of Southern California, in discussing the federal proposal flatly asserts:

"The plan borders on the fantastic. The project would consume untold years and billions of dollars. There would be no end to interstate and political complications, to say nothing of private property interests. The technical and physical difficulties to be



Metropolitan aqueduct cost $225,000,000. Columbia River aqueduct to southern California would cost billions

overcome are tremendous. California would be called upon to pay the major part of the costs. Eastern taxpayers cannot be expected to take the burden as a federal expenditure."

Obviously Mr. Howard, who unquestionably qualifies as one of California's leading experts in matters pertaining to water supply, does not like the Columbia River aqueduct idea. Governor Earl Warren, who unhappily sponsored increased public power and reclamation projects for the West in his 1948 campaign speeches, likewise now fails to register any degree of warmth toward this federal project. Governor Warren, in a magazine article, points out that only when such an aqueduct crosses state boundary lines does it become necessary for a commonwealth to appeal to the federal government for aid, and that even then no central authority at Washington ever should administer such a project. He then asserts that the greatest evil of top-heavy, expensive federal bureaus is not the operating cost of such organizations, but the fact that through these agencies government inevitably becomes farther and farther removed from the control of the people.

Studying the statements of Mr. Howard and Governor Warren, it becomes evident that both of these gentleman consider the proposed Columbia River aqueduct to be something of a boondoggle, essayed by federal agencies who wish to take advantage of a local crisis in order to secure further vast appropriations of federal funds. Obviously the California authorities fear federal activity which might eventually convert the entire West Coast into a gigantic TVA.

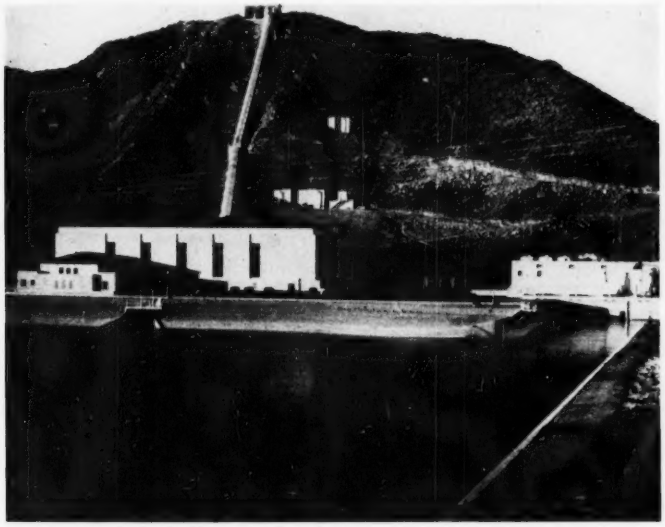
The California spokesmen point out that the water shortage in the Southwest is purely a local problem and one that can be solved by local agencies with a bit of assistance from the engineers of our Navy. Already proposals are being set forth by California scientists, the California State Legislature, and U. S. Navy engineers for a sound and permanent solution to the Southwest's water problem which calls for the expenditure of not one cent of federal funds. Here, in brief, is the alternative plan to that of diverting the Columbia River to California.

Water by Distillation

Ever since Navy ships have been operated by steam, water has been taken from the sea, distilled, and used in battleship boilers as fresh water. During World War II, Navy engineers found it absolutely necessary to perfect means of converting far greater quantities of sea water into potable fresh water. Their improved equipment functioned, not only aboard men-of-war, but on hundreds of islands throughout the Pacific Ocean on which millions of our troops were at various times quartered. In peacetime a handful of island natives could store sufficient rainwater for drinking; in time of war large concentrations of troops called for a much larger water supply.

All California authorities agree that the Navy method of producing fresh water from sea water is entirely practicable as a solution for the Southwest's water problem. The Navy's plant at Port Hueneme, Calif., proves this system to be equally applicable in any coastal area, including also those sections of the Atlantic seaboard in which underground sources of water supply have been seriously depleted to the point where salt from the ocean seeps in and tends to render municipal water brackish. And the Navy's distillation system can be installed locally, as needed, by city and district waterworks without federal aid. A water distillation plant can be installed exactly as a municipal sewage disposal plant is erected—by floating a local bond issue. At most a nominal appropriation from the state legislature for experimentation is necessitated. A bill appropriating a million dollars for such development effort was submitted to the California legislature but failed to pass.

So far as California's water problem is concerned, Navy engineers have called attention to another serious defect in the Reclamation Bureau's plan to bring water southward from the Colorado River. This 2,000-mile aqueduct, they say, must inevitably be vulnerable in time of war at any point along its tremendous span, and the water supply of great aircraft, shipbuilding, and agricultural centers would therefore needlessly remain in constant jeopardy. On the other hand, individual plants designed to evapo-



Untold power would be required to pump Columbia River water to California

rate sea water could be much more readily protected from enemy bombing and contamination.

Objections to the distillation system have been raised by reclamation engineers on the basis of the cost of fuel required to convert sea water into fresh water. But at once atomic scientists have replied that, long before Columbia River water could be brought to California, the use of atomic energy as a fuel will be not only entirely practicable, but inexpensive to utilize for distillation of enormous quantities of sea water.

Until atomic energy piles are available, however, there exists in California ample supplies of natural gas and petroleum sufficient to carry on essential water distillation operations.

Aqueduct Cost Prohibitive

The truth is that a Columbia River aqueduct of the type contemplated by the U. S. Bureau of Reclamation would cost infinitely more than would a series of local water distillation plants serving southern California cities. Indeed, such a project would cost many more billions than all the TVAs and other federal "authorities" existing, or at this time proposed, within the United States.

The Metropolitan Aqueduct, extending only across the state of California, cost half a billion dollars to construct in a period when labor and material costs were low, and when every effort was made to avoid wasteful construction methods. The Columbia River aqueduct would be an infinitely greater project and in itself would cost many times this amount to build. But this is by no means the whole story.

The federal plans for this Columbia River aqueduct not only call for an additional series of dams along the Columbia River, but also include a further string of dams astride other rivers emptying into the Pacific Ocean. And at each of these proposed dams a federally owned hydroelectric power house is to be built.

During World War II, when the industries and farms of this nation were faced with a desperate shortage of labor, the U. S. Bureau of Reclamation built 12 great dams to complete the total of 28 in its TVA project. This enormous expenditure in wealth and labor was justified as "aiding the war effort." Yet the only power from the TVA ever to be utilized for defense purposes was that furnished to the Oak Ridge atomic plant. And at Oak Ridge a single small steam power house, built at a fraction of the cost of the least of the 28 TVA dams, could have furnished all the power required at the atomic plant.

It is also interesting to note that the TVA, built at enormous cost to the taxpayers (not even the TVA knows how many billions this completed project will have cost to build), furnishes less electric power from its 28 dams than do the steam generating plants of such privately owned power companies as those which serve cities like New York or Chicago. "Free public power" has long proved effective as a political slogan, but when you total up the cost of hydroelectric power houses and stand-by steam plants, there is nothing "free" about it.

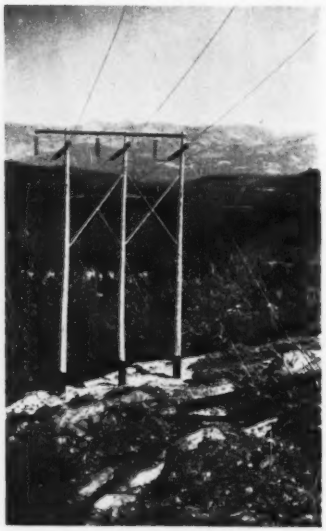
Federal Help Not Needed

As Governor Warren has pointed out, southern California's water problem is essentially something for the citizens of southern California to solve. It does not concern, and its cost should never be saddled onto, the Eastern manufacturer or the Midwest farmer. There exists no good reason why the federal government should be permitted to interfere in this matter. The Owens River Aqueduct, the Metropolitan Aqueduct, and even the irrigation system for Imperial Valley—all of these great California engineering projects were built solely with funds locally subscribed. No federal appropriations ever were utilized in constructing these earlier aqueducts. It is not generally known that enormously fertile Imperial Valley was transformed from bleak desert solely with water furnished by a private corporation. Likewise, little publicity has been given to the fact that the only reliable flood-control systems ever built in this country were constructed by local (not federal) agencies.

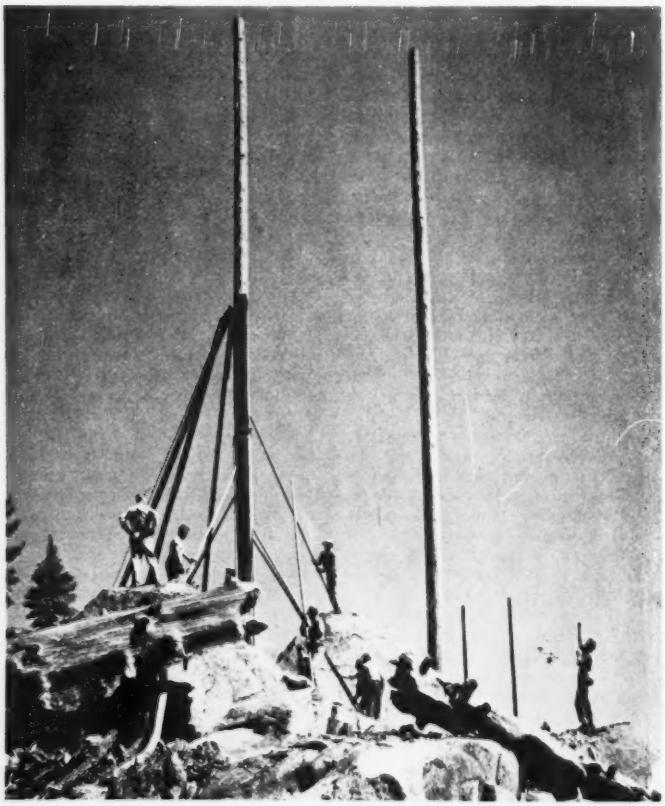
There can be no valid excuse for asking citizens of other states to pay their share of any undertaking designed to furnish more water for southern California's agriculture and industry.

Just as our scientists in an emergency quickly developed a synthetic rubber which has proved equal or superior to the real thing, and a nylon that is a genuine improvement over silk, so these same technical men can quickly make those refinements in process which may be required in applying, wherever necessary—to coastwise municipalities, and for irrigation of millions of acres of farms and orchards—the Navy's system of converting sea water into fresh water. The supply of water in the ocean is inexhaustible. And for every acre-foot of coastal sea water distilled, an acre-foot of river water can be released for use in inland agricultural areas.

Best of all, however, local municipal water departments can build and operate individual distillation plants of this type at no prohibitive expense to anyone, just as all such city water supply projects have in the past been locally conceived, constructed and operated. There can then exist no excuse for any federal bureau to take advantage of a water shortage crisis in any area as a means of securing virtual control of the economy of that region.



Two views of line passing over storm-swept Donner Summit (7,135 ft.) are shown above. Donner Lake may be seen in background of right view. This section of line traverses a solid granite terrain. Copper conductors, steel crossarms, X-bracing and heavy guying are expected to withstand the icy gales of winter in the High Sierra district



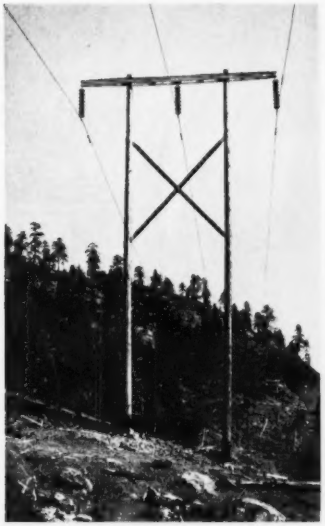
Tough going was encountered throughout the line as may be seen in this view. Here PG & E crews had gotten a tractor-mounted derrick to this boulder-strewn point to set the poles. Time- and labor-saving equipment and methods were used to fullest possible extent

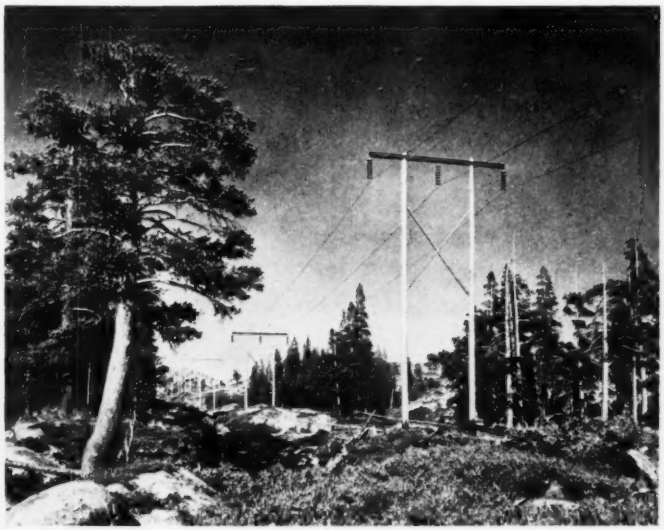
Rugged 110-kv.

Steel crossarms, full width right-of-way and use of X-bracing contribute to making important new 110-kv. line as nearly outage-proof as physically practicable

DURABILITY and dependability were prime considerations in establishing a third tie between Pacific Gas and Electric Co. and Sierra Pacific Power Co. The line was built to supplement two existing 60-kv. lines. It is the result of a new long-term contract between the two utilities and is Sierra Pacific's answer to the need for an additional and dependable power supply to the city of Reno, Nev., and the territory served by the Nevada utility.

The new 58-mile line, traversing the High Sierra for the most part and crossing Donner Summit at an elevation of 7,135 ft., extends from





Typical tangent structures on the two sections of line are shown above. At left is PG & E structure using field-assembled galvanized steel channel crossarms. View to right shows Sierra Pacific line. On this section of line factory-assembled black channel iron arms were used. Steel offered greater sustained strength and less weight

Transmission

Drum power house of PG and E to California substation of Sierra Pacific, near the California-Nevada state line close to Verdi, Nev. Three features of the line are especially worthy of note. First, the use of steel crossarms on the H-frame wood structures; second, the clearing of right-of-way to a width so that no falling tree can reach the line; and third, extensive use of X-braces to increase strength against transverse loading.

Steel Arms

Use of steel crossarms on H-frame wood pole structures is new on the West Coast with the exception of one other 110-kv. line recently built by PG and E and another piece of line built many years ago. On the new Sierra line a little different type of arm was used by PG and E on its section of the line from Drum to the summit than that used by Sierra Pacific on its section from Donner Summit to California sub. PG and E

View to right shows man with two-way radio pack set directing string-in of conductors. Same equipment was used for sagging-in. Three mobile and two portable pack set stations were used to large time- and cost-saving advantage, especially in this rugged terrain

Right-of-way clearing so that no falling tree can reach line shown at left above was justifiable insurance against outage. Below is shown type of steel channel crossarm used on PG & E's section of line. At right may be seen method used by Petersen Engineering Co. for erecting completely assembled H-frame structures on Sierra end of line. Spreader bar is used to maintain rigidity of the structure while being raised by the tractor-mounted derrick

used 5-in. to 7-in. galvanized channel, back-to-back, assembled in the field. Sierra Pacific used black iron channels of the same general dimensions. These were furnished by Hubbard & Co. and were shop assembled and welded. Satisfactory experience by Sierra Pacific with black iron over a period of years led to omission of the galvanizing on its end of the line. This effected a saving in the cost of galvanizing and moreover, and very importantly, permitted shop assembly and welding, materially reducing field labor costs.

Several factors entered into each utility's choice of the steel arms as against wood timber arms. Primary consideration was high and sustained strength over a long period of years. Comparable strength plank arms would have been heavier, besides offering greater wind resistance.

Cost of the Sierra-Pacific arms completely assembled, including through bolts, was $71 each. The standard arm used on tangent sections of the line consists of double 6-in. channels, 25 ft. in length and weighing approximately 500 lb.

PG and E's Section of Line

PG and E built from Drum power house to Donner Summit, a distance of 28 miles. Pertinent data include the following: Class of poles, 1 and 2; average pole height, 60 ft.; prevailing span, 600 ft.; steel arms on H-frame wood pole structure; conductor, 397,500-cir. mil., ACSR (Ibis); conductors armor rodded; vibration dampers provided on long spans; X-braces used where called for by span length and degree of exposure; graded clearing of right-of-way so nothing can reach line; ground wires omitted due to infrequency of lightning.

Pacific Gas and Electric Co. built its section of the line with its own construction forces. Terrain was particularly rugged as indicated by some of the accompanying photographs. Labor-saving equipment was used to the fullest advantage. It was possible to get an air compressor in to practically all of the rock holes, of which there was a large percentage. For the most part, poles were set with a tractor-mounted boom. Because of difficult terrain, poles were set individually and all framing done in the air. Steel crossarms were assembled on the ground and dropped down over the top of the poles. Power for graining, sawing and boring was provided by a portable Homelite a-c engine-driven generator. Three mobile and one portable FM radio transmitter-receivers greatly facilitated wire stringing and effected large savings.

Sierra Pacific Line

Sierra Pacific contracted its 30-mile section of the line to the Petersen Engineering Co. of San Francisco. Because of the shortness of the summer season the contractor was given only 120 days to perform a most difficult piece of line construction. The line traverses the east side of the Sierra Nevada Mountains; thence through Dog Valley, following an entirely different route to California substation than the two existing 60-kv. lines. Some data of interest on this section of line are: Class of pole, 2 and 3; average pole height, 55 ft.; average span, 520 ft.; steel arms on H-frame wood pole structures; conductor, 7-strand 4-0 hard drawn copper; no armor rods; no dampers; Joslyn X-braces on 250 out of 300 structures; right-of-way cleared to width so that no falling trees can reach line; ground wires omitted due to infrequency of lightning.

Labor Saving Methods

Petersen Engineering Co., like PG and E, made full use of labor-saving methods and equipment. In the case of the contractor, he set most of his structures as a unit, complete with arms and insulators mounted, as illustrated. He, too, used two-way FM radio for spotting poles, stringing conductor and job coordination.

The accompanying photographs show interesting features of design and construction of the entire line as well as adding drama to a most interesting piece of line construction.

Keep Meters Off Bedroom Walls

Meter at left on bedroom wall might better have been installed as at right

WHEN a customer complains of a noisy meter, it can be explained that noise does not affect accuracy of registration. But when the meter is located so that the noise disturbs his sleep, there is no satisfactory explanation. What the customer wants is complete noise elimination. Manufacturers have made progress in eliminating the inherent noises in watt-hour meters, but they have been unable to make a noiseless a-c meter. Location of the meter is an important factor in the noise problem, both to the customer and the serving agency.

Service requirements of the Los Angeles Department of Water & Power contain the following important provision: "No meter shall be located on, or recessed in, any bedroom wall or any bedroom closet wall without permission of the customers' inspection section." This provision was written into the city's requirements in an effort to alleviate the meter noise problem. Before adopting the provision, a survey was made of 191 single-family residences to see if the requirement would increase the customer's wiring costs. Results were as follows: Meters mounted on bedroom walls and installation made in the best and most economical manner, 72.1%; meters located on bedroom walls that would have required an average of 12 ft. of service conduit to have located them in the approved location, 6.8%; meters located on bedroom walls that could have been located at the approved location at no increase in cost, 14.3%; meters located on bedroom walls that could have been located in the approved location at a saving, 5.4%; meters located on bedroom walls where the problem of installing the meters in the approved location was such that an exception undoubtedly would have been made, 1.4%. Thus, in 26.5% of the cases the meters could have been located elsewhere than on a bedroom wall.

The number of noisy meter complaints of all types increased from 903 in 1945 to 1,201 for the calendar year of 1948. Since the beginning of the year 1949, a survey was made of noisy meter complaints to determine the number of cases where meters were mounted on bedroom walls and the complaint could not be eliminated to the satisfaction of the customer. It was found that 12% were in this class. Of these, 50% were recessed, 25% flush mounted, and 25% surface mounted. Every attempt was made to alleviate the noise by such methods as insulating with rubber or celotex, tightening laminations or changing meters. Obviously, the problem became more difficult in the case of socket-type meters where the mounting is more rigid.

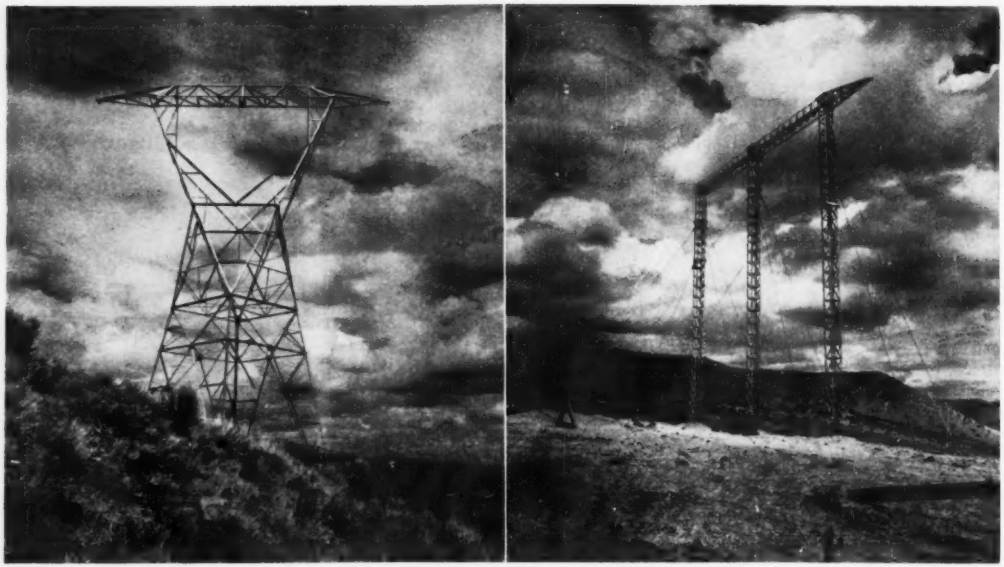
One hundred and forty-four (12% of 1,201) dissatisfied customers a year is something that cannot be overlooked by any electric utility. The rule of prohibiting the installation of meters on bedroom walls is in effect by other serving agencies in southern California. It is believed to be the best answer to the problem of sleep disturbing noises from watt-hour meters.

HOT LINE SHORTCUT

Use of a 50-ft. pole boom extension to a truck derrick in connection with 33-kv. hot line work effected large savings for the California Electric Power Co. on a recent maintenance job. Poles and crossarms on the company's 33-kv. line from Palm Springs to Twentynine Palms had shrunk to the extent that the vibration caused by strong winds in that area had actually caused a failure of a number of $\frac{5}{8}$-in. through bolts. It was necessary to tighten hardware and replace the through bolts with U-bolts on 168 poles.

The set-up illustrated, designed by F. E. Reinhart, made it possible to untie all three conductors and lift them sufficiently to enable the necessary work to be done. As may be seen from the photograph, a standard 6-pin crossarm was placed at right angles to the top of the pole boom. Three treated ropes were run through pulleys and attached to hot-line insulating links which in turn hooked onto the conductors. As the tie wires were removed from each insulator, the conductor was pulled up in the clear.

A great deal of time was saved, compared with that which would have been required if each conductor had been raised with the customary jack and hot-line sticks. Direct labor for the 168 poles had been estimated at $1,100, while the actual labor charges with the short-cut method described amounted to only $655.50 ($3.85 per pole), or 40% under the estimate.



Type of light steel tower (left) adopted by Bonneville Power Administration to reduce transmission line costs. Tower weighs 7,828 lb. including foundations as compared with weight of 13,321 lb. including foundations for the standard 70-ft. steel tower heretofore used. Light steel design is intended only for comparatively light loading areas. Guyed latticed steel poles (right) are used at angle points and dead-ends in new design philosophy

Light Steel Towers Cut Transmission Costs

IN a constant endeavor to reduce transmission line construction costs the Bonneville Power Administration has developed a new light-weight steel tower that will effect savings ranging upward from 10% on annual costs as compared with H-frame wood pole construction extensively used during the war. The new light-steel tower is being used in the light loading area east of the Cascade Mountains on Bonneville's 230-kv. line now under construction between Grand Coulee and Snohomish substation near Everett, Wash.

The light steel tower is really a compromise in strength and cost between H-frame wood pole structures and the administration's standard heavy-duty steel tower. There is more than merely a new tower design involved. There is also a new philosophy in transmission design and operation. The idea that a tower must be of sufficient strength to withstand the longitudinal strain of one broken conductor, or an unbalanced pull of 12,000 lb. in the case of BPA's standard tower, was modified. Instead, the new light steel tower is designed for the usual transverse loading, but for a longitudinal pull of only 3,000 pounds.

Tests on the new design were conducted at the plant of the American Bridge Co., Pittsburgh, Pa. Design conditions were ½-in. of ice and 8-lb. wind with a 1,050-ft. span. Calculated vertical loading under these conditions is 3,500 lb. at each conductor support, and tranverse loading of 1,600 lb. at two conductor supports. Design called for longitudinal pull of 3,000 lb. Longitudinal pull was applied at the end of the crossarms until failure. Failure ocurred at a load of 7,700 lb., indicating that the light steel tower design is adequate for the assumed loading conditions.

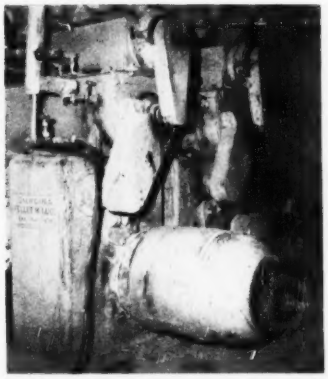
The new transmission philosophy was based upon two premises. First, that H-frame wood pole structures do not have great strength against longitudinal strains, yet make good lines and have a very distinct cost advantage, and second, the administration has not had a broken conductor due to ice loading on any 230-kv. line since the federal system was placed in operation—an experience of over 7,000 mile-years of 230-kv. operation. A new philosophy with reference to dead-end and angle structures also was adopted. The idea that these must be rigid self-supporting structures, likewise was modified for purposes of the objective. Instead, guyed latticed steel poles, as illustrated, are used.

Two important savings are effected in the new type structures. First, a direct saving in the cost of steel, and second, 45% saving in the cost of structure erection. As compared with wood pole structures, computed savings are: first cost, light steel, 100%; wood poles, spar arms, 81%; annual costs, light steel, 90%; wood poles, 100%. These figures include interest on investment, amortization (steel 50 years, wood poles, 25 years), operating and maintenance on structures. They do not include cost of surveying, right-of-way or other non-structural costs common to both types of lines. The study shows that for a 19% greater capital cost a far superior steel structure line is obtained and at an annual saving of at least 10%. It may prove considerably greater. Bonneville expects to use the new design in fairly accessible light loading areas of flat and rolling to moderately rough terrain. More than 100 miles of such lines are now under construction.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 61

SUBJECT: Steam Generator for Poultry Feed
SERVICE CO.: B. C. Electric Railway Co.
DATA PREPARED BY: F. Nosworthy
CUSTOMER'S NAME: Brackman-Ker Milling Co.
TYPE OF BUSINESS: Dairy and Poultry Feed Producers



Description — The Brackman - Ker Milling Co. Ltd., one of the largest dairy and poultry feed producers in British Columbia, required a steam supply for the manufacture of "pellets."

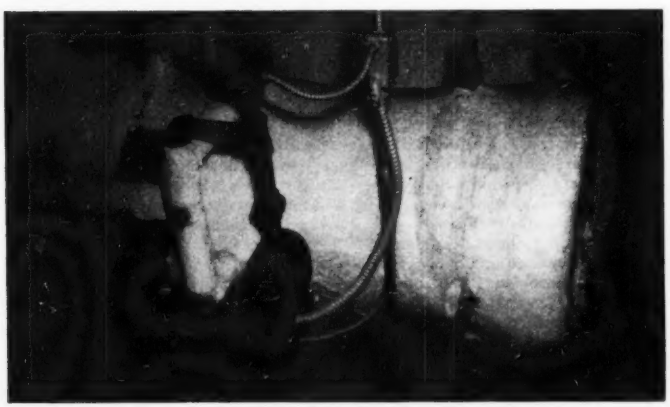
Pellets are small, hard cylinders of dry mash of bite-size and are used as feed for chickens, turkeys and rabbits. They are made by heating a dry mash with steam and forcing it through dies of various sizes. The advantages of the pellets over dry mash are that they prevent waste, add variety, and provide a balanced diet. They have proved popular with poultrymen.

An electric steam generator was recommended and a Canadian General Electric steam generator of 40-kw. capacity (30 kw. installed) was placed in service. It is equipped with pressure and temperature controls and is fully automatic.

Test runs showed that energy consumption per ton of pellets averaged only 14.78 kwh. At the customer's average rate, this is only 14.5c per ton of pellets.

Capacity and Operating Data of Steam Generator

Connected load—30 k.v.
Boiler rating—3 b. hp.
Supplies steam at 16 to 20 p.s.i.
Operated (normal)—8 hr. per day or 200 hr. per mo.
(seasonal)—Up to 16 hr. per day.
Per ton of pellets—40 lb. steam; approx. 15 kwh.
Electricity cost per ton pellets—aprox. 15c.



Heating Molasses Tank Cars—The steam generator is also used to heat tank cars of molasses during the winter months when the molasses is too cold to flow freely into storage tanks. This job formerly was done by spotting the tank car on the railway siding of a nearby meat packing plant and connecting to the steam line of that plant. The company now uses its own steam.

Requirements vary somewhat with the molasses temperature and the ambient temperature. The average requirements are approximately 600 pounds of steam per tank car, produced by 200 kwh. It is found that the time taken now is in the neighborhood of eight hours which is a 50 per cent reduction over the former method; and there is the added convenience of doing this job at the company's plant.

Customer Satisfaction—The demand for pellet type of feed has so increased, and the company is so well satisfied with the performance and economy of this installation, that it has ordered a second electrical steam generator and additional pellet machines.

Fig. 1

Fig. 2

Fig. 3

THE OFFICE LIGHTING COMPLAINT—

THERE is no question that many of the office fluorescent lighting systems currently being installed are bound to result in headaches, not only for those who use them but for many members of the lighting industry itself.

It is a matter of record that entirely too many office area workers, using the tubular lighting sources, complain about their lighting conditions.

As utility lighting specialists, and as part of the service the utility offers, we are naturally called in as lighting "trouble shooters." While we may have little or no influence on the original fixture selections, still we must diagnose the troubles and suggest practical solutions to the problems. With justifiable customer complaints our lighting specialists find the odds badly stacked against them. The utility specialists occupy the middle position between the electrical trade and the customers, attempting to keep both satisfied as the installation is designed, sold, installed and put into operation. However, customer satisfaction is a long-term matter, for the customer is still buying lighting through energy costs long after the contractor, supplier and manufacturer have been paid.

Almost all commercial lighting complaints in San Francisco concern the type of installation recently modernized or relighted. While the luminaires may be any of several types, the most common are suspended units providing an intensity in the 50-60 foot-candle. Ceiling heights are from 10 to 14 ft., and reflectances encountered in the lower field of view—desk tops, floor and office equipment—are almost invariably low. High reflectances are usually found to exist on the ceilings and walls because most modernization or relighting of offices includes refinishing these surfaces suitably.

By far the greatest percentage of all office space falls in this average office field. Consequently, a large potential market is directly involved. In view of the increasing number of complaints from this classification of business and the size of the potential market, a serious lighting problem exists. The lighting industry should be seriously concerned about it. By analysis and close cooperation of those affected, the causes can be rooted out without undue delay.

While there have been several instances where direct glare from the fixtures has been annoying, this is relatively infrequent. Most of the complaints indicate excessive source brightness downward that results in reflected glare off desk tops and from the materials ordinarily used upon them.

From the way the complaints constantly come in and from what the customers have to say, it would appear that poor fluorescent office lighting conditions are the rule rather than the exception. When a customer phones in to say, "There's too much light in my office and we can't see," we know that probably there is brightness trouble for we know there cannot be too much light. The average new installation provides only about 50 f-c of light intensity, but the customer does not complain of too much light when he steps out-of-doors into natural light intensities up to 10,000 f-c. Therefore, the finger of suspicion is naturally pointed at "uncontrolled brightness" or "uncontrolled reflected brightness."

It is not unusual for a secretary to call up and say, "Will you give us a lighting recommendation for our office here. Our girls are all complaining about the fluorescent lights. For my part, I've worked in a number of offices under fluorescent lights and they have all hurt my eyes. Isn't there something else that you can suggest for us here?" So-called modern office lighting conditions have aggravated enough of this office-worker antipathy towards fluorescent lighting to make us stop and wonder considerably about it. Such reactions hurt the entire lighting industry no end, and they are steadily growing in volume.

By sympathetic questioning of customers we often learn that a new fluorescent lighting system has been installed—just long enough for the installation bills to be paid and the new lighting given a reasonable trial. Bona fide reasons for eye strain are invariably found to exist. Of course, immediately after such a change in lighting is made there is ordinarily some criticism, both pro and con, due to the change itself. However, our recorded cases cover only persistent complaints.

Many will say that competition tends to force the average jobs into

Fig. 4

Fig. 5

Fig. 6

TOO MUCH GLARE

Charles W. Macy
Pacific Gas and Electric Co.

the category of very ordinary installations. Agreed, competition often has entered into sales of fixtures on price alone and light quality has simply been subordinated to fixture cost or fixture appearance. However, light quality for seeing is the basic reason for the customer's investment in office lighting and it should be emphasized throughout a sale for this application.

The better installation naturally costs more. So does a better automobile. One gets just what he pays for. If the amount of money is limited, then the amount of the area to be relighted should likewise be limited to fit that condition. Stretching cash or credit over too great an area to be relighted can result only in a "skimmed milk" type of installation—reasonable light quality must necessarily be forfeited. The man who purchases two cars for the price of one has to cut drastically somewhere — the service from either one is bound to be greatly lowered from what he might have anticipated from one first-class car.

Of course, increased connected load and revenue result from the sale of better installations, as against the competitive type jobs, but they provide completely satisfactory, comfortable and pleasant lighting. After all, this is normally what the customer is seeking and his complete satisfaction certainly comes first. He is the one who pays the bills.

Office lighting should be comfortable and pleasant and at the same time practical and economical to promote and install. Excessive brightness and reflected brightness must be eliminated if we are to satisfy customers. And believe it or not, this is relatively easy to accomplish in almost all cases.

Most fixtures now recommended and used for office lighting have moderate to low surface brightness in the 45-90° zone. Against a light ceiling and walls the brightness ratio is within acceptable limits. The bulk of the complaints indicate excessive brightnesses in the 0-45° zone, resulting in reflected glare off desk tops and milled paper, glint from polished metal parts of typewriters and business machines and annoying shadows under the hand when writing.

Some may think that there is a happy medium fixture for all lighting purposes, an "all things to all men" sort of answer. But good seeing conditions are accomplished by selecting fixtures of proper technical fitness for each separate lighting problem. Just suppose the oculists were to follow a plan of prescribing all-purpose eye glasses for all visual deficiencies. There is no such simple answer to all seeing problems. There is not now, nor ever will be, a lighting fixture that is a first class "all things to all lighting problems."

Customer demand forced the lighting industry to provide soft, pleasant and comfortable lighting for office use in the incandescent lighting fixture days. I predict that customer demand will force us all in the industry to provide the same sort of lighting with the fluorescent sources. We might better as a group recognize the advantages to be gained and do something about it ourselves before the reactions have done us immeasurable harm through loss of customer confidence and considerable business.

"Don't live in the past," but we should be willing to think back to incandescent lighting days if there is a lesson there. The evolution of incandescent fixtures from the bare incandescent lamp to the luminous indirect incandescent fixture in office lighting provides a fairly close parallel to the present situation. Most manufacturers finally placed the latter type of fixture in their lines and sold it with evident success and satisfaction to the user. This fixture brightness below the horizontal did not usually exceed 333 foot-lamberts.

As a review of office lighting practice I call your attention to Fig. 1. These are the old enclosing bowls—we now call them "Balls of Fire." Evidently the customers reaction to glare resulted generally in a complete reversal in fixture types—to 100% indirect —indicated by Fig. 2. Along came the silvered-bowl lamp and together with the inside frost lamps we finally ended up with installations depicted by both Fig. 3 and 4. Both were relatively low-brightness units. There were many more similar units, all of which resulted in satisfaction to the customer at levels ranging from 30 to 45 f-c in intensity.

We all understand that the heat released incident to this type of light source had much to do with the leveling off at this point to a top average

Fig. 7

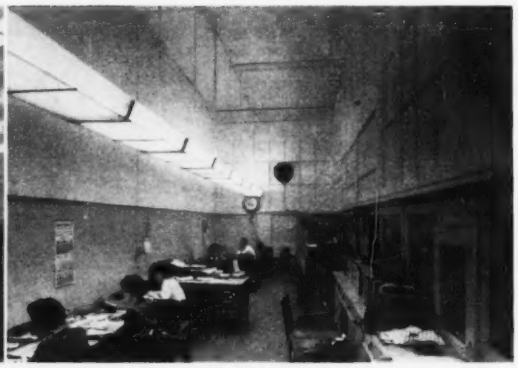


Fig. 8

light intensity of about 45 f-c. Probably we arrived at about the practical limit for all indandescent general office applications. No one will ever know in view of the introduction of fluorescent sources shortly before World War II. We came then to repeat the cycle in fluorescent lighting fixtures which I will try to show in a general way with the following views. Consider Fig. 5. Although this is a combination office and store, many of such bare-lamp fixtures were installed in office areas — need I say more? Then along came the conventional URC-type fixtures with an attempt to be all things to all men, usually mounted on the same outlets from which previous incandescent units had been discarded. Typical installations are shown in Fig. 6 and 7.

The customer was often sold on a basis of getting as much light for less electrical energy cost. Sometimes he was sold on the basis of more than twice as much light for the same energy costs. However, little or nothing was said about excessive brightness or reflected brightness. That's where this story comes in. What had happened to the lesson we had learned with incandescent fixtures about excessive fixture brightness? Even new construction employed much the same type of light source, although by this time the war was in full swing and fixtures in general had been frozen as to design. Fig. 6 is also a good example of this era. However, the reflection factors in the lower visual zone have been considerably improved as evident in this view. Fig. 7 is an example of a relatively high ceiling area. Many seem to believe that relatively higher source brightness may be used. We have yet to learn the degree. It didn't work here. Our specifications called for treating the bottom panels with a thin white lacquer coating to reduce the normal surface brightness to a maximum of 333 f-l in service. Our recommendation was not followed and complaints resulted. The panels were then treated as suggested—the complaints of brightness ceased immediately.

Fig. 8 shows another high-ceiling installation, a more difficult job to design in that it is high, long and narrow. Again our recommendations were ignored in part. Conventional units were installed, mounted higher than shown, less in number and individually. The job bounced hard. The subject was reopened. The number of fixtures was increased. They were mounted lower and in a continuous row and the bottom panels were treated as in the previous case. The results were entirely satisfactory. This experiance indicated that a cycle was in progress similar to that experienced with the incandescent units. The customers were demanding comfortable and glare-free office lighting.

Experience has a definite place in the lighting design. Experienced data cannot be lightly brushed aside in fa-

Fig. 11 [with dense glass]

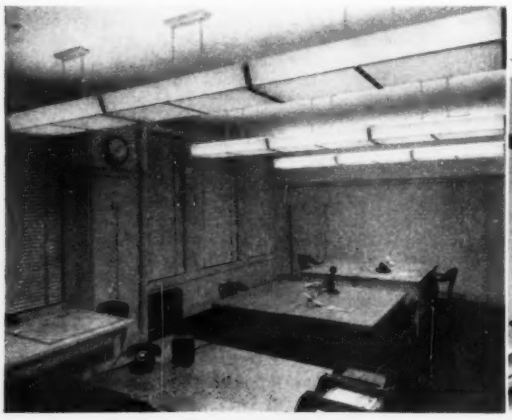


Fig. 12

Fig. 9

(with bright glass) Fig. 10 (See Fig. 11)

vor of pure theoretical contentions based upon laboratory conditions. We must bridge the gap between the highly theoretical and the practical for application in the lighting field. Let me relate to you what happened to us right here in some of our own office space.

In the spring of 1946 we relighted seven full floors in each of the two adjacent office buildings at 445 and 447 Sutter St., San Francisco. A total of 40,000 sq. ft. of office space was refixtured with conventional type of fluorescent units. The buildings are owned, operated and occupied throughout by the same firm. All types of office seeing tasks are encountered within these areas. The URC-type fixture used here has enjoyed particular popularity among suspended fluorescent office lighting installations in San Francisco during the past nine years. Also, this type has been by no means free from criticism as a cause of customer complaints.

In view of our previous experience with reflected glare and because denser glass or plastic materials were not available, a wartime expedient was employed. All bottom panels of ribbed diffusing glass were specially treated by coating them with a white lacquer in order to diminish the downward brightness to a maximum in service of 333 f-l at 90° to the surface. The so-called "ceramic coated" side panels, although measuring approximately 350 f-l, were not treated or changed in any way at the time of installation.

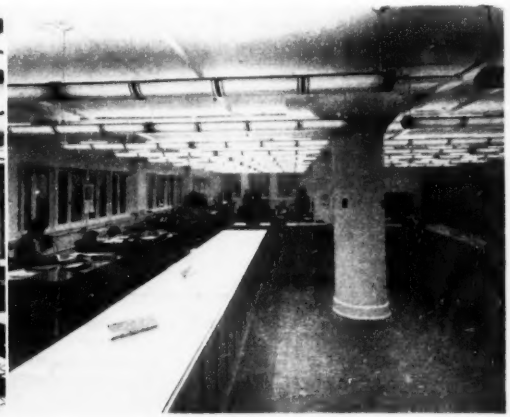
First results were quite satisfactory and no complaints were registered for some little time. However, with periodic washings in connection with regular maintenance, the coating on the bottom panels was reduced and the downward brightness increased steadily, creating reflected glare from the desk and table tops. Brightness complaints commenced within the first year of use, increasing with each successive washing of the bottom panels. At the close of the first two-year period the lighting condition on all floors had deteriorated to brightness levels as in Fig. 9, 10.

At this point, in the spring of 1948, a comparative brightness study was made, using one of the URC-type units with 3,500° K. lamps aged to 400 hours, and five different types of commercially obtainable glass-bottom panels, including the original ribbed highly translucent glass, but coated as described above. More information was needed on comparative brightness with differing bottom panels and the resultant effect on utilization. Somewhat short of laboratory conditions, in a 10x10-ft. cubical room, painted a flat white, foot-candle intensity and brightness readings were taken. The results are shown in chart on the next page.

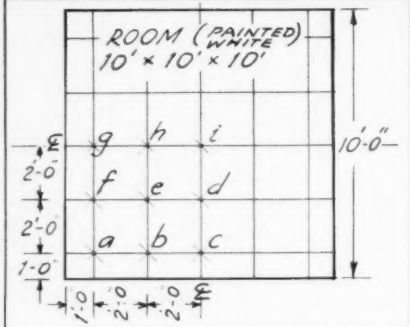
The last line on this chart marked (x) was added as an interesting feature to show how, in an actual test of

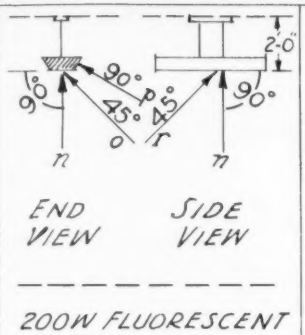
Fig. 13

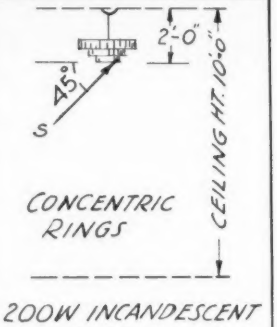
Fig. 14



COMPARATIVE INTENSITY AND BRIGHTNESS STUDY







F.C READINGS TAKEN AT LETTERED POINTS - ON FLOOR

F.L. READINGS TAKEN IN DIRECTION OF ARROWS - ON SHIELD

Line (See text)	Type panels	Reflec. Factors	Trans. Factors	Avg. f-c	Fixture Brightness N. 90° to Bottom panel	O. 45° to Bottom width	R. 45° to Bottom length	P. 90° to Side panel	Ceiling Brightness Ceiling f-l Over fixture	Close to wall
1	Coated conv'l.	34%	44%	22 f-c	325 f-l	300 f-l	290 f-l	350 f-l	170 f-l	24 f-l
2	Conv'l. glass	24	62	29	1400	235	360	350	187	19
3	1/8 in. ribbed	26	62	27	470	425	390	470	220	25
4	7/32 in. ribbed	34	54	25	410	430	420	360	270	23
5	1/8 in. denser, ribbed	62	26	23	280	270	270	240	240	30
(X)	— Concentric rings			9		280			45	25

this sort, one of our most efficient 200-watt incandescent indirect units compares with the 200-watt fluorescent semi-indirect units (lines 1 and 5). This incandescent unit provides an average intensity of 9 f-c as against the 23 f-c shown on line 5, roughly a 1 to 2.4 ratio. If fixtures with brightness measurements depicted on line 5 actually satisfy our customers in offices, we are then giving these customers 2.4 times as much light for their wattage dollar with a low-brightness fluorescent source as against an incandescent low-brightness source. We can provide greater intensities with the glass panels recorded on lines 2, 3 and 4, but the glare becomes excessive and the customers start phoning in for help. The light output efficiency or intensity on the desk top counts for something, true, but the eye acts somewhat like a camera—it records more easily when there is plenty of light intensity but with an absence of glare. A highly efficient conventional URC-type lighting fixture without glare control is comparable to a modern efficient automobile without a windshield. But who likes dust in his eyes?

One of the private offices provided a particularly interesting experiment. The occupant, a man of approximately 50 years, uses bifocal lenses continually. He has a daily routine involving considerable checking of reports and reading figures under conditions of poor contrast. This relatively severe seeing problem was accepted as a challenge to verify or disprove a conviction that fixture brightness in the reflected glare zone should not exceed 333 f-l in service for lighting levels in the 50-60 f-c range.

The office itself is 12x16 ft. with a 10-ft. ceiling. Carpeting is light beige and furniture a natural light oak. Fig. 12 shows the office as it is today with dense 1/8-in. ribbed glass panels in place on both sides and bottoms of the fixtures.

Over the past three years the occupant of this office has spent long periods under each of five lighting conditions. Using the same URC-type fixtures, but with changes in glass panels and lamps, the lighting conditions and his reactions were as follows:

1. Units equipped with 3,500° K. lamps, coated glass-bottom panels (line 1 in chart) and ceramic-treated side panels. Average illumination on working plane slightly in excess of 50 f-c. Lighting conditions generally comfortable and satisfactory, although some objection to color quality.

2. No change from above except that lacquer coating had worn off bottom panels due to routine washing and maintenance. Average foot-candle level increased to 60 and brightnesses to those shown on line 2 of chart. Excessive reflected glare created an unsatisfactory working environment.

3. Bottom and side panels changed to 1/8-in. ribbed glass with characteristics as shown on line 3 of chart. Both reflected and direct glare was excessive and lighting was uncomfortable.

4. Bottom and side panels changed to 1/8-in. dense ribbed glass with characteristics as shown on line 5 of chart. All lighting complaint ceased and the occupant was delighted with seeing conditions.

5. Lamps were changed to 3,000° warm-type lamps. The user was enthusiastic about color quality and believed that the lighting was softer and

more pleasant. He felt also that visitors had a more natural appearance. Other employees working in the building have expressed a preference for this warmer source and there have been no negative reactions to date.

In summing up the five conditions above, we can say that in services:

1 Was barely satisfactory
2 Was quite unsatisfactory
3 Was quite unsatisfactory
4 Was entirely satisfactory
5 Was eminently satisfactory and the user is enthusiastically in its favor.

Such luminaires of low brightness are used successfully in larger offices, especially where furniture, office fixtures and floor coverings are unusually dark. Installations of this type are shown in the following photographs:

The first (Fig. 13) shows the general office of the Edward R. Brown Co. at 536 Mission St., San Francisco. Conventional URC-type units, equipped with Mona-Lite glass diffusers and 3,000° K. lamps are used. The original estimate and proposition of 120 suspended-louvered units was increased to 190 of the units shown in the view with low-brightness characteristics. Low reflection factors below eye level required the utmost care with brightness contrasts. Fortunately the low-brightness units were installed.

The second (Fig. 14) is a view of the general office of James F. Waters Inc. at 1355 Van Ness Ave., San Francisco. Four-lamp Slimline units with 200-ma. ballasts were installed. Fair to poor reflection factors and some glass desk tops again demanded extreme care in the matter of source brightness. This turned out to be an exceptionally comfortable and pleasant office installation.

The third (Fig. 15) shows the general office of the California Casualty Indemnity Exchange at 22 Battery St., San Francisco. This time four-lamp Slimline units with 300-ma. ballasts and 3,000° K lamps were used. Fair to good reflection factors existed. An unusually pleasant and comfortable atmosphere is created within this office area.

The fourth view (Fig. 16) shows a private office of the Spott Electrical Co. at 576 22nd St., Oakland. This 100% glass-paneled ceiling provides about 100 f-c of light intensity with a brightness at 90° to the panels, of 220 f-l. There are relatively low reflection features in the lower field of view but, in spite of this common condition, no extreme ratios of light intensities or brightness contrasts are to be found within the entire room. The seeing conditions are eminently satisfactory and lighting specialists enthuse about this office immediately when they see it.

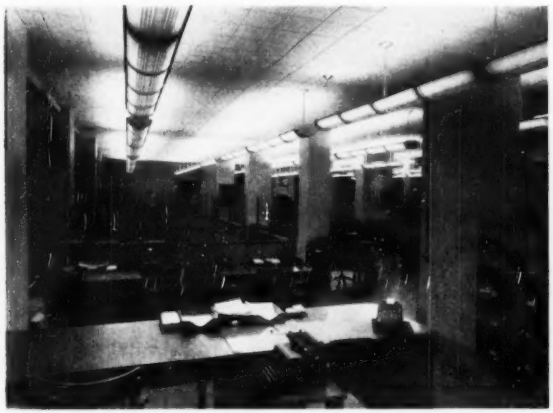


Fig. 15

Fig. 16

This fourth installation may seem somewhat extreme to the uninitiated. It may raise the question of relatively high cost per square foot when compared with the conventional methods now generally employed. In quantity production this type of installation for office areas should compare most favorably with Louverall ceilings for merchandising applications, perhaps be cheaper. Of course, it is far easier to justify higher cost per square foot for merchandising than for office use. With merchandising it is possible to obtain actual figures on increased sales while with offices there is only increased efficiency to count on, an elusive value to compute for most office managers. Undoubtedly many of the managers of comparatively large office areas are equipped to make trustworthy estimates based on scientifically accepted methods and will be able to prove the degree of improved value for this application. At present there are few such installations to be found for practical study. How close to a lighting specialist's dream this comes for a man-created artificial sky; surely much closer to the conditions provided by nature itself than any of the other installation types shown. If reducing unit costs bring this type of construction within a reasonable price range we should see more of it. Who can tell; perhaps we'll shortly see a cycle in lighting where Louverall ceilings will be used for merchandising areas and 100% panel lighting for office areas. One is as sensible as the other and the prices to install per square foot should be comparable.

Our last view (Fig. 17) shows a comparatively small private office. In this office, in spite of much darker reflection factors, a soft and pleasant lighting condition prevails.

The importance of our IES Recommended Practices cannot be overstressed. However, they should be both reasonably exact and readily understood by the rank and file of our lighting group. Recommendations on office lighting fixtures, for example, should be based on field conditions as found rather than on some theoretical office whose reflectances are high and all of those desk tops, business machines and typewriters have a utopian dull finish. The average office lighting problem is not a design for the new multi-storied building where furniture, flooring and wall finishes can be selected. The problem is the relighting of existing office areas or groups of small offices, bringing visual comfort to many persons at reasonable cost. Let's do it right.

It is not always possible to follow

strict interpretations of our rightly valued lighting treatises. On this matter of reflected brightnesses it is actually difficult to find any great amount of information covering it. Evidently little information has thus far been developed from empirical data or practical case histories. Most brightness or glare studies have completely avoided the *reflected* brightness factor while emphasizing direct glass—particularly that above the 45° angle. However, the latest IES Recommended Practice of Office Lighting on page 9 under paragraph 3.31 referring to direct glare, states:

"(d) In general, the brightness of luminaires for office lighting should not exceed 400 f-l within the recommended shielded zone. Reference to Table 11 will indicate the necessity of selecting luminaires with lower brightness if they present large areas to the direct view of office occupants or if they are used in very large rooms or if used at extremely low mounting heights. Although some increase in brightness may be permitted with favorable conditions, such as recommended reflectance surroundings, increased illumination values, high mounting heights and small luminaire areas, brightness has such a pronounced effect on comfort that reduction rather than increase in brightness is recommended.

This implies that fixture brightnesses of 400 f-l are acceptable within the direct glare zone—45° to horizontal—and higher fixture brightnesses within the reflected glare zone—45° to vertical. It is interesting to note that this is the only place in which the term foot-lambert is mentioned, except for a passing reference to trans-illuminated drafting tables on page 34. The paragraphs on reflected glare, page 10, merely suggest that "the brightness of reflected images is within reasonable limits." The other suggestions on fixture placement relative to desks, light-colored matte finishes for desk tops, the use of dull paper stock and finishes on office machines are excellent, but it is not always possible to put these into practice. It is possible, however, to do something about office lighting fixtures.

These experiences and many others indicate to us that office lighting luminaires should be designed with a maximum brightness of perhaps 333 f-l from horizontal down to directly beneath the unit. Such a limitation would apply, of course, to office lighting intensities up to the 50-60 f-c range and ceiling heights up to perhaps 14 feet. At higher lighting levels, such luminous indirect units might easily create excessive ceiling brightnesses. For higher ceilings the utilization would be low. Luminaires with slightly greater bottom panel brightness may safely be used at higher mounting heights since overlap and wall reflections will soften shadows and reflected glare as well as direct glare is a function of distance.

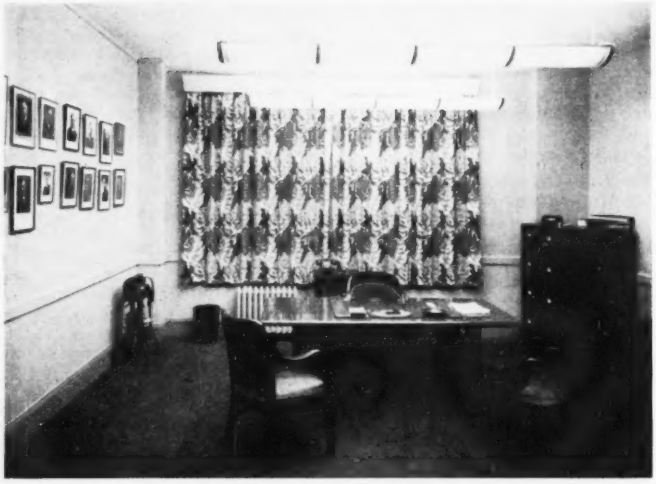


Fig. 17

While the URC-type luminaire has been used here to illustrate the need for elimination of reflected glare, there is no intent to be critical of the design. The over-all efficiency is reasonably high and the cost relatively low. Provided with sufficiently dense glass or plastic bottom panels, it has a definite place for relighting of offices where economy is important. It is encouraging to note that a number of the newer slimline fixtures for office lighting are of the luminous indirect type. Some excellent office installations have been made with such units. Fig. 15 is a typical example

The experiments and studies covered above embody conditions found in average office areas — areas from which virtually all the customer complaints have arisen. The correction methods employed should assist in providing answers for many "sick" jobs within the classification of office lighting. Furthermore all our experience indicates that we in the lighting industry should get together for improvement in our office lighting design. Whether a proposal is for one of the larger installations, which logically calls for the services of a consulting engineer, or for the smaller types which can be handled by the lighting specialists, we can well afford to agree on lighting fixture characteristics that will afford the customer complete satisfaction.

How much better it would be for everyone concerned if technical errors could be caught on the drawing boards well in advance of the actual offering of proposals to customers. In this particular classification of office lighting there obviously exists a definite need for technically correct specifications. An opportunity exists for some generally acceptable method to be developed and tried out. It might be dubbed a "Certified Office Lighting" plan. By tightening up the restrictions in order that practical and workable layouts only would be thus certified, everyone concerned would benefit considerably. A certified plan or layout as such would call for all bids being based on the one all-important result for the customer—*good seeing conditions*. Questionable or poor substitutions could be almost entirely eliminated without loss to any of the conscientious participants. The level of lighting design would be materially raised and the customers would eventually laud the efforts of any and all those participating. Customer confidence would be materially enhanced and repeat business justified.

The advent of the fluorescent lighting source was a definite boon to customers and the lighting industry. This, no one can deny. It gave impetus to lighting through a new, interesting and more efficient light source. But how much better and easier it would prosper and expand if the wrinkles were smoothed out, mistakes and misinterpretations corrected and the customer complaints cut to a minimum. It appears to be high time that we took stock to see just how and where we are going.

Five Bad Questions in Contracting—

WHAT WILL THE ANSWER BE?

A. R. Wooley*
Mountain Electric Co., Pocatello

OUR problems do not vary. The electrical contractors in the state of Idaho have exactly the same problems basically as you have. The only possible difference might be in the order of importance in which we place them, and the effectiveness of our efforts in dealing with them. So far our efforts could not be considered more than partially effective because those efforts have been only partially attempted.

Considerable lip service has been rendered to many of our common difficulties. This is important since, only by talking about them, can we get them into definite focus, and thus recognize them as problems. Once we fully recognize a problem, then the more we study it, the better chance we will have of coming up with a workable answer.

My subject today is: "What will the answer be?" Let me say now that I do not pretend to bring you the answers. I am going to give further lip service to those problems in our industry that my fellow contractors and I consider to be the most important ones facing us today, and suggest what, to me, seems a logical program of activity to dig up the answers—or to create conditions that will help find the answers.

My concern and hope here today is to center attention on our mutual difficulties, and get our thinking caps to working on them. I believe our chief trouble lies in the fact that we are individually so frantically busy running our own little businesses that we just haven't had time to give our industry problems more than passing thought. However, I feel it is high time we did do some real individual and collective thinking on the subject, and follow up this thinking with some collective action.

The members of the Idaho Electrical Contractors' Assn. consider the following to be our major problems:

1. The elimination of bad electrical installation practices.
2. The elimination of bad contractor electrical practices.
3. The elimination of bad labor relations.
4. The elimination of bad electrical distribution practices.
5. The elimination of bad general contractor practices.

I know that advertisers and good merchandisers tell us we should use positive, not negative terms. In other words, instead of phrasing our problem as I did, "the elimination of bad electrical installation practices," I should have said, "the fostering of good electrical installation practices." However, I don't agree in that premise in so far as our present subjects are concerned. To say we should foster good implies, at least, that conditions are now fair. While they might be worse, they are not fair now; they are really bad. So, let's accentuate the positive, as the song said, and eliminate the negative, the bad conditions in our industry today.

Now, I would like to take these separately and break them up into their obvious components.

1. *The elimination of bad electrical installation practices*—Poor workmanship, the use of shoddy and low-standard materials, the application of materials into a job below code or common-sense standards. The creation of a danger to life and property by these acts becomes a matter of public interest and, as such, it is possible to look to the law for preventive measures to help us in the elimination of this number one problem. Some success has been achieved in this matter by our association in Idaho through the efforts of several of our leading contractors under the leadership of Bill Hopper of Boise. We have a law, and this law can be expected to make bad electrical installation practices unlawful, and can be expected to force correction. Beyond that I do not think you can look to the law for help.

2. *The elimination of bad electrical contractor practices*—There is a beauty! Don't look to the law to help you on this one.

Below-cost bidding; pirating the other fellow's labor; defamation of your competitor's character and ability; cheating the job by robbing it of adequacy; willfully inducing (by false and deceptive means) a customer away from your competitor; cheating the job by using cheap materials; making secret side deals to swing the contract; availing yourself of sub rosa confidential information to make a second or third bid and, in this manner, stay low bidder; these, and many others, constitute our No. 2 problem.

They are pretty well covered in the Federal Trade Commission Rules for Electrical Contracting Industry, as approved by the Federal Trade Commission on Nov. 10, 1941. Those I mention are actually violations of Group (1) in the act, and as such place the offender in position of violation of the Unfair Trade Practices Act.

Will any electrical contractor deny that, somewhere along the line, he has been guilty of an unfair trade practice? I'll admit I have, and I won't believe anyone who says he hasn't.

No, we can't look to the law to solve this one for us. This is one for us to solve. The solution of this problem lies within ourselves individually. Codes of ethics, Unfair Practices Acts—just baloney. But, if you want to do something about correcting these bad practices, then I suggest you just try it. You'll be surprised how rapidly and how completely successful you can be in eliminating bad contractor practices.

While the law can't help you solve this problem, a strong trade organization can. No one of us is so hard-shelled as to enjoy, or continue to invite, the circumstances of ostracism that such an organization could place around a guilty contractor, be he member or non-member.

Another thing an organization can do, and must do if it survives, is to educate its members in the basic and fundamental principles of the electrical contracting business. If all of your competitors knew as much about this business as you do—as much about costs, overheads, direct job expenses, accounting costs, taxes, supplementary compensation costs, liability and property damage insurance costs, supervisory costs, estimating costs, etc., etc. — then you would know, beyond a doubt, what a damn fool he was to bid as low as you did on that job.

* As president of the Idaho State Electrical Contractors Assn., given at the convention of Electrical Contractors Society of Washington.

Let's educate ourselves in our business—one and all!

Labor

The elimination of bad labor relations—A lot of thought has already gone into this one. Of sheer necessity we have had to think about it since it is a basic cost of our industry and, because it has had so much attention, I feel it has had better handling. To me, the real problem in our industry with labor today is not a question of wages. A good electrician is worth his hire at present rates with a 60c dollar.

Our real problem is the poor and mediocre electrician, and their numbers exceed the good ones, unfortunately. This is a condition you can't blame entirely on the unions either.

It is largely a result of war and cost-plus contract with general contractors doing their own electrical work under I. O. contracts; that's where these gold-brickers and featherbedding electricians were made!

Now, we've got them with us, but already time has helped either by eliminating some of them from the labor market, and by educating some of them to a sounder viewpoint and degree of productivity. A little more time with the effective operation of our Joint Apprentice Committee will take care of this problem.

Distributors

The elimination of bad electrical distribution practices—This has been a problem of our industry since the birth of the first stepladder lineman. Aside from some present-day accentuations due to increased numbers of distributors and manufacturers and some reductions in business volume, slow but steady progress toward a more equitable policy of pricing and protective selling on the part of manufacturers and distributors is being felt beneficially by the electrical contractor. More can and will be done.

It would seem to me that the old time-honored distributor policy of selling to our industrial customers at the same or about the same price, just because that industrial plant has a maintenance electrician, is a policy that is now quite vulnerable, and one which a strong organization could expect to change for betterment of the contractor with surprising ease.

No doubt you could name others. Things that have created our individual pet peeves with our various suppliers, but I would suggest one thing at a time and first things first. Also, we must be fair. Bear in mind that, unless there is a positive economic reason for the thing we request—unless we can prove that our industry and the public will *both* benefit by granting the thing we ask, then we should not ask for it.

We cannot exist as a "protected profession." We exist and thrive on our economic contributions to our society of which we are but an infinitesimal part.

Generals

The elimination of bad general contractors' practices—I left this one to the last, not because it is least important—to me it is of first importance—but I discuss this one last in the hope I can deal with the subject fairly and without bursting a bloodvessel.

How completely we are at the mercy of our general contractor friends! How willingly these same friends would eliminate us from their picture if they could. Give to the general contractors the privilege of hiring their electricians as they do their carpenters, and where is our electrical contracting industry? We would be reduced to Fix-it Shops of the Wallett- and Bobble-type overnight.

Please don't get me wrong! Unless I felt that, as an electrical contractor, I could install electrical material and apparatus at a saving in cost to the public, and likewise insure the public a protection to life and property it would not get under the other system, I would get out of this electrical contracting business immediately.

Some of our problems parallel those of the general contractor, but also the general contractor is one of our biggest problems.

How else can you regard the flagrant violation of all ethics of bidding practice that is constantly and continuously being indulged in by the great majority of general contractors, and has now become so general practice as to be considered no violation of ethics at all?

And why has "competitive bidding" degenerated to "competitor chiseling?"

Only for two basic reasons: One is that the general contractor wants to get the lowest possible price, and the other is that the electrical contractor wants the job. Ethics haven't been able to stand up under that double-pointed attack.

I can't blame the general contractor any more or less than I blame ourselves. He is guilty of the same identical violations within his group as those I mentioned for our own. General contractors have no bigger, and no smaller, halos than we have. We are all individuals, prompted by the same motives and the same circumstances.

But I do contend that it is unnecessary and unwise for us to continue to allow the general contractor to retain the throttle grip he has at our throats.

What can be done about it is a moot question. Let me leave this thought with you:

I spoke a few minutes ago of I. O. contracts. You are all familiar with them and how they got started. I sincerely hope that those of you dealing with union labor will harp continuously on the injustice of these contracts—to the end that they can be completely wiped out. Your locals want to see them go. Urge them to put on all the pressure they can with the International office. These contracts during their life have developed the most convincing proof imaginable of my statement of a few moments ago that we, as electrical contractors, offer an economic service to our society. You can all find examples to prove this. If we believe this, as I'm sure we all do, then our next step should be to convince others of it.

Let's start out with the architect. If he is convinced, then maybe he will do something to help us stay in business. The architect can—if convinced—require the electrical bids on his jobs to be bid direct and opened at the same time as the general bid. Incidentally, I firmly believe, by such a course, he will save his client money. Accomplish that, and we will bring our industry more nearly into its proper place than by any other one thing we can do.

Here again our organization can help. Let's think about it.

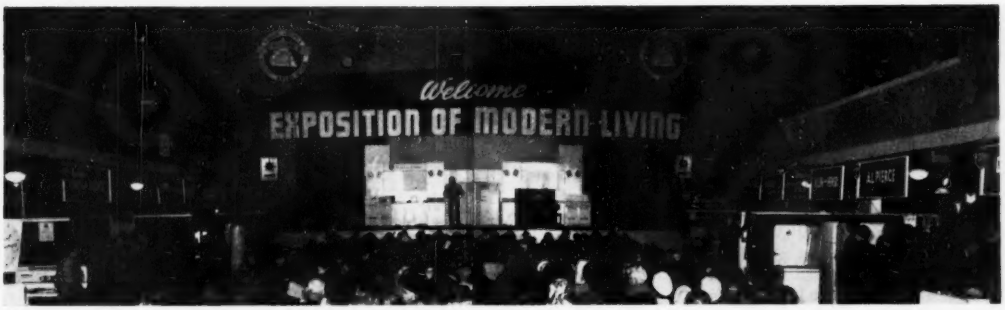
I suggest that, through our organizations, their boards of directors, and their managers, we correlate a definite thought program with periodic bulletins that will aim to channel our entire industry's thinking along the same thought at the same time, and urge all members to make that their subject of conversation with everyone with whom they do business during that period.

Take one thing at a time and sell it to our architects, our customers—yes, and our general contractors. We won't gain anything by beating around the bush as far as they are concerned. Let them know frankly what we are doing and why. They will respect us for it as we will respect ourselves.

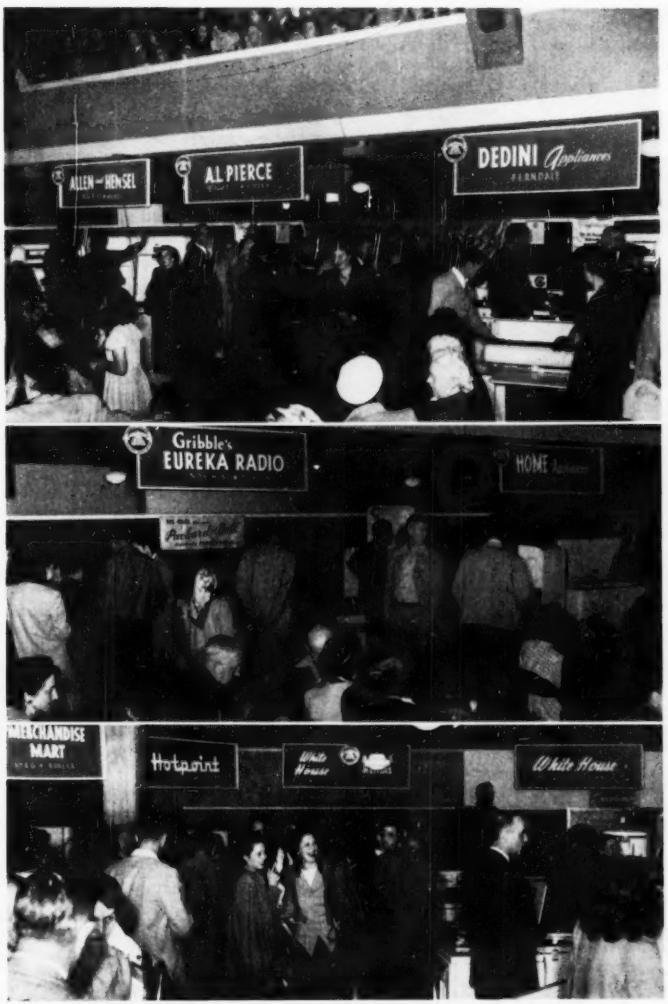
We have a legitimate business.

It is an economic necessity.

Let's treat it with the respect that it deserves.



HUMBOLDT APPLIANCE DEALERS STAGE BIG SHOW



Progressive dealers' association stages modern living exposition that draws attendance of 9,500. Sales for the three days far exceed cost of the show which also develops more prospects

FOR the third successive year the Humboldt Appliance Dealers Assn. has staged an appliance display under the banner, "Exposition of Modern Living." This year's three-day show, put on in the Eureka civic auditorium Sept. 27-29, proved the most successful of all, attracting a total attendance of 9,500. Volume of sales was far in excess of the cost of the show. Total cost was $2,350, of which $660 was spent for advertising in newspapers and on the radio. "Never for so little could you buy so much," was the promotional theme used this year.

Afternoons were devoted to cooking demonstrations by a home economist furnished by the Pacific Gas and Electric Co. This part of the exposition attracted 2,500 women. Entertainment provided during the evenings brought a total of 7,000. A number of expensive attendance prizes totaling $2,200 in value proved an attractive drawing card. Attendance cards filled out for the prize drawings were to be distributed among members of the association for prospect lists.

The Humboldt Appliance Dealers Assn., formed in 1946, now has a membership of 35 dealers located in Arcata, Eureka, Ferndale, Fortuna and Garberville. The association has recently become a unit of the Northern California Electrical Bureau which will give it the advantage of the National Adequate Wiring certification plan as well as enabling it to share in the educational and promotional activities of the bureau.

Electrical West—Vol. 103, No. 5

IEA Views Appliance Opportunities

At Action-Packed Ogden Annual Meeting

CONCENTRATING on the theme "Opportunities Unlimited," more than 150 members of the Intermountain Electrical Assn. made an intensive study of electrical sales potentials during their third annual business meeting at Ogden, Utah, Oct. 7. Seventeen speakers, two of whom came from San Francisco for the meeting, participated in the five hours of business sessions, followed by a banquet. Paul DeVine was the general conference chairman; Carlos W. Stone, IEA manager coordinated the program.

Objects of IEA and purpose and theme of the meeting were covered by Ora H. Barlow, Mountain States Tel. & Tel., as he opened the morning session. IEA President J. F. McAllister, Utah Power & Light, drew on his 29 years as a member of IEA to outline its history and development. He brought members up to date on the year's accomplishments and described the work of the IEA in studying legislation, in policing fair trade violations, and in doing its area's share in the campaign for adequate wiring.

Henry Richards, assistant manager, Granite Furniture Co., Salt Lake City, described the relationship of IEA to the electrical industry, and enumerated its advantages: (1) Valuable information and ideas from the prominent men who address the meetings; (2) added business through the association's appliance promotion campaigns; (3) better business relations through getting to know their competitors; (4) a better industry to work in because the IEA sponsors legislation helpful to the business and fights that which isn't.

A major section of the morning session was devoted to "sales through service" in which three appliance dealers participated. M. H. Merrill, president, Merrill Appliance Co., Salt Lake City, said that dealers must realize no appliance was better than the service that backed it up, and that the pleased customer is the best prospect for future sales. But, he said, service department operation is a costly job. The dealer must learn how to operate a service department efficiently if he wants it to be profitable and if he wants it to create satisfied customers. He needs trained and courteous servicemen who must keep up to date on the products and who must be diplomats in talking to customers. He emphasized that the acceptance of trade-ins, their reconditioning and resale are *musts* in appliance dealer operation. Every dealer who expects to continue operating in a competitive market must be prepared to handle trade-ins profitably, he said. His own operation brought a $3,000 net profit on the handling of refrigerator trade-ins, reconditioning and resale, during the first nine months of 1949.

Service must be more far reaching than the use of screwdrivers and pliers, if it is to result in sales for the dealer, said Morgan Sorensen, sales manager, Southeast Furniture Co., Salt Lake City. Service must be conducted in a clean and orderly place of business that will impress the customer with the efficiency of the department. Successful service means an organization and management that smiles, that is courteous and considerate of the customer, and that is alert to public needs.

Good servicemen are one of the best ways to keep customers trading in the dealer's store, said John Seaman of Boyle's Furniture Co., Ogden. To do this, the dealer must select servicemen on the basis of personality, because it is possible to teach mechanical competence but impossible to teach a man to have a personality. However, he said, dealers should not try to have servicemen sell appliances while on service calls. Such practice, he said, detracts from their attention to the service job, makes the customer suspicious of their intentions, and injures the relationship. The most effective work of the serviceman is to do such a good service job and to be such a pleasant and nice person to the customer that the way is paved for the regular salesman.

Although programmed "The Salesmen Speak," it was sales managers, who did. Whether a home freezer is a luxury or a necessity was discussed by Clarence Packard, sales manager, Jackson Distributing Co., Salt Lake City. He did not answer the question; instead gave a good selling slogan, "nothing is more luxurious than owning a home freezer, but nothing is more of a necessity in the home." He said there is a definite need for more training of retail salesmen in the use value of home freezers, and the variety of uses to which they can be put.

Buchanan Moffatt Stratford Longden

Vern Halliday, sales manager, Walter B. Lloyd Co., Salt Lake City, discussed "Sales Through Selling," with emphasis on the need for well-trained, hard-working specialty selling at retail level in order to keep up the level of appliance sales necessary to match the nation's increased production capacity and the larger number of retail appliance outlets. He was followed by Walter J. Michelson, sales manager of the W. H. Bintz Co., Salt Lake City, who impressed the group with his picture of the replacement market that awaited intensive selling. In the IEA area, more than 40% of the refrigerators were more than ten years old, 44% of the electric ranges were more than ten years old. He advised dealers never to give a trade-in price until they had fully demonstrated the new product. The more thorough and successful the demonstration, the more willing will

be the customer to accept a reasonable trade-in price.

Increasing Appliance Sales

"A bigger and better appliance business can be built by any dealer through a well-founded 'Service-Sales Partnership.' One complements the other, and together they make an unbeatable combination that means success, growth and increased profits," said W. I. Buchanan, Pacific Coast regional manager of Frigidaire, the morning session featured guest.

"'Using your users' is the meat of what I am saying, but you must inject the word 'satisfied' because these are the only users you can use successfully," advised Buchanan. "A dissatisfied user will use you and your company—to tear down your reputation. Experience has proved that the dissatisfied user that you know about is an asset, compared with the one about whom you have no knowledge. You can do something to correct the product trouble or complaint and state of mind and attitude of the user who calls upon you for service and assistance."

Barlow De Vine McAllister Lowder

Sales Opportunities

A variety of sales opportunities for appliance dealers and methods of approaching them were discussed at the afternoon session, under the chairmanship of Collins Lowder, president of the Ogden Chapter.

"Don't sell terms, sell merchandise," advised Don Stitt, general manager, Strevell-Patterson Finance Co., Ogden, in the opening afternoon talk on term selling. He told the group that the industry was fast returning to the situation in which 80% of the appliance sales would be on term contracts. Yet this was a necessary thing because it was a combination of mass production and time payments that had made possible the country's high standard of living.

He advised the dealer to make time payments easy for the customer to understand by marking the merchandise clearly with the amount of down payment necessary and the monthly terms.

"Advertising is not an expense, it is an investment," according to J. S. Francom, president of Francom Advertising Agency, Ogden, in his discussion of the advantages and use of advertising. Well used, advertising serves to inform the public, to smooth the way for the salesmen, to create demands that mean lower cost production. But it is not an end in itself, he said, it is only one of several tools, including clean, attractive stores, dependable merchandise at prices people can afford, and well-informed, courteous salesmen. Francom said that small town appliance dealers have been letting business go to big city dealers because they don't advertise in proportion to these big city dealers. He recommended 2½% as a sound level.

On the same subject, Julian R. Stevens, advertising manager of the Ogden *Standard-Examiner*, emphasized the importance and use of advertising to the appliance dealer.

Those dealers attending the IEA meeting who came from other than the Salt Lake City area received a stimulus from the words of O. F. Achtenhagen, WESCO, Los Angeles, who said that radio sales would continue in spite of television. Salt Lake City dealers were inspired by his analysis of the great potential for television. He analyzed the growth and development of television, particularly the transmission end. The industry already has invested $90,000,000 in telecasting equipment. He said that "the public wants TV, is ready for it, and has the money to buy it."

Getting the Order

Point-of-scale advice for appliance dealers was dealt out to the group by Douglas Wood, sales manager, Peterson Electric Co., Salt Lake City, in a discussion of "Effective Salesmanship." He put his emphasis on closing the sale, advising the salesman to look for the signs that the prospect was ready to be signed up. When she said "how much to install?" "how much down payment?" "when can I get delivery?" "what can I get for my old appliance?" That is when the salesman should leave his sales talk and concentrate on getting the signature on the dotted line, Wood said. Then he advised the appliance salesman to ask the customers something that would draw "yes" answers to get her into the habit of "yessing," and never to ask a question that would bring a "no." He suggested that they keep slipping into their sales talk the questions, "when would you want delivery?" "which model is best for your home?" "how long would you like the payments to extend?" "what color or what size, etc.?"

Potential Market

Following a short session in which manufacturers' agents were given a chance to introduce new developments they had to offer, J. J. Moffatt, Pacific Coast Manager, appliance division, Westinghouse Electric Corp. San Francisco, reviewed the potential market for appliances in the IEA area, and called attention to the means by which the appliance dealer could get his share of the business. He outlined in detail twelve points for the dealer to keep in mind: (1) Integrity of management; (2) courage of management to accept changes and to develop new markets; (3) Imagination to reach out for new ideas and new methods; (4) experience of management, with a knowledge of the old ways adapted to present conditions; (5) good store layout and arrangement of merchandise; (6) trained sales organization using materials and helps from the distributors and manufacturers; (7) a well-paid sales organization; (8) a sales policy in which the emphasis is on demonstrating to sell; (9) a policy for accepting and handling trade-ins at a profit; (10) a steady program of advertising and promotion; (11) adequate financing for the dealer operations, through local banks if possible; (12) inventory control and a policy of not overbuying during scares.

The third annual business meeting of the IEA concluded in the evening with a banquet at which nearly 160 members and guests attended. Under the chairmanship of John Longden, manager of WESCO, Salt Lake City, the program was highlighted by a talk from Dr. W. B. Stratford, head of the department of social and political science, Weber College, Ogden.

There's Action in Arizona

PLENTY of planning and first-rate promotion introduced Central Arizona Light & Power Co.'s re-entry into appliance merchandising last month. Calapco's out to help Phoenix appliance dealers get their cut in the estimated $9,692,000 appliance market that lies ahead. Dealers were told the company doesn't intend to go into full-scale merchandising, but will sell directly only appliances and equipment that can't profitably be sold by dealer outlets.

Calapco's advertising, says Don Willis, general sales manager, will emphasize service and economy of appliances, will direct prospective customers to "your favorite appliance dealer."

Integral part of the utility's *Back in Action* program will be word of mouth advertising among its 1,200 employees who will compete for merchandise prizes by contributing the names of prospective buyers which will be relayed to appliance dealers.

Briefly Calapco's nine-point *Plan of Action*, as outlined first at a dealers' meeting and set down in three-color booklet form, will operate like this:

1. *Prospect Development* — The company will maintain an up-to-date customer record file to provide dealers with leads on prospective purchasers. Sales representatives and consultants will call on every user of gas and electricity at least once each year, noting present appliances and equipment and talking up new ones.

2. *Home Service*—The home service director and her advisory staff will hold appliance demonstrations on the dealers' sales floors; give free demonstrations of major appliances to purchasers in their own homes; conduct cooking schools; stage homemaking and cooking classes in Calapco's auditorium.

3. *Displays*—The sales floors of all the company's district offices will be available for distributor outlet sponsored displays of major appliances and campaign items.

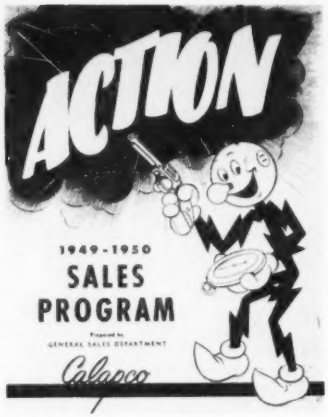
4. *Dealer Sales Training*—To help dealers build aggressive sales forces, Calapco will conduct fundamental sales training programs, refresher courses and manufacturers' previews of new developments in the field.

5. *Sales Manual*—To build customer confidence in the knowledge of dealers and their salesmen, Calapco is preparing for free distribution to participating dealers a sales manual containing information on wiring, proper sizes of heating, cooling and water heating equipment, as well as operating cost analyses, installation data and sales pointers.

6. *Sales Bulletin* — Every month dealers will receive a Calapco-published sales bulletin, showing how many of each type of appliance have been sold the previous month. A monthly sales bulletin will contain a breakdown of total number of all kinds of appliances sold the previous month, news of electric and gas service extensions planned for the immediate future and sales helps and tips.

7. *Dealer Sales Meetings*—At the start of specific campaigns, general meetings will give dealers the opportunity to look over the plan of attack and map their own strategy accordingly. Special dealer meetings will feature experts in thermostats, gas heating, electric water heater controls, air conditioning and appliances.

8. *Special Dealer Tie-in Material*—Point of sale material will be made available to dealers at no cost to them. This includes price tags, demonstration request tags, banners, displays.



9. *Advertising*—An intensive advertising campaign by Calapco to sell more of its electric and gas services by selling more appliances.

1949-50 sales campaigns will push lighting, hot water heating installations, space heating, all-year air conditioning, electric bed covering, table cookery and small appliances, Christmas lighting, television and extra set radios, automatic laundry equipment, adequate wiring, refrigerators and freezers, ranges, evaporative coolers.

Colossal, of course, was the first national television and radio exposition, sponsored by the Southern California Radio & Electrical Appliance Assn., at Shrine convention hall, Los Angeles, Oct. 15-23. Engineered by showman W. J. Quinn (right), managing director of the association, staged by Tabery Corp., participated in by all seven Los Angeles television stations, the Academy of Television Arts & Science, television committee of the L. A. Chamber of Commerce, and exhibited in by manufacturers, many of them local, distributors, dealers, service companies, magazines, TV film advertising producers, even TV viewing furniture, it drew record crowds day and night

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © NOVEMBER, 1949

"Catch 'em Young"—said Sam

"WE don't need any more courses in salesmanship! What we need is a good course for dealers on how to **handle** salesmen. And where to **find** them."

That was Sam Vining, famous and spectacular selling consultant, speaking to a Rocky Mountain Electrical League meeting.

Why? Because (1) Fewer salesmen are selling appliances than even a year ago. (2) Recent surveys of both high school and college students, asking what careers they'd choose, turned up **not one** who mentioned selling.

If I was running an appliance store today, said Salesman Sam Vining, (and he **has** run a successful appliance store so he talks experience), this is how I'd recruit and train salesmen:

Recruiting: Forget about newspaper ads. They bring in the drifters, the ne'er-do-wells, the bums and the down-and-outers. Once in awhile an uncut jewel will be discovered. But not often enough to balance the time and expense wasted sorting 'em.

Look around among the neighborhood people. Pick out the most likely looking young fellow you can find. Probably he'll be a war veteran. Choose one who obviously **likes people,** who has personality and who isn't afraid of work. They can be found. Then talk to him about joining your business. Don't tell him you want to make him into a salesman. Assure him that you have an opening in your firm for a youngster with ambition. Tell him that you would be happy to have him join your organization to **learn** the appliance business. If you have picked the right boy, he will.

Training Step No. 1: First off, put him in the **service department.** Don't throw a manufacturer's course in sales training at him now, or perhaps ever. Let him learn by association to cherish and respect the fine finish on appliances and the fine workmanship of their mechanisms. He'll find out quickly that the last tool to use on a nut is a pair of pliers. Keep him in the service department until he knows the appliances and what makes them tick.

Training Step No. 2: Next send him out on the delivery truck. There is no faster way to find out what a new appliance means to a woman than to see the expression of happiness and joy that comes over her face when a new automatic washer or a new electric range is delivered to her home. Tell the lad that if he speaks more than **one word** of greeting to the customer, you'll put him back in the shop. He's there **to observe** and **to listen.** Very soon he'll absorb some of the enthusiasm and some of the feeling that a satisfied customer has for her electrical appliances. When this happens, he's ready for

Training Step No. 3: Move him into the store, with his only assignment that of keeping the displays neat and clean, seeing that appliances are ready to be demonstrated and the store has an appearance of orderliness. Tell him to watch you and some of the other salesmen in your handling of customers. And be sure to tell him

that selling is **FUN** and that buying is **FUN** and that it is his job to see that both the customer and himself **enjoy** fully every minute of any discussion about the benefits and service of an appliance.

If you've picked the right kind of a boy in the first place and if you have thoroughly convinced him that this is a fine and interesting and profitable business, you won't be surprised at what happens next. Some day a woman will walk into the store and start looking around. You and the other salesman will be busy. The lad will walk up to her and say, "Madam, may I help you?" And he'll begin selling.

And best of all, when some of the people in the neighborhood—his friends and your potential customers—ask him what he's doing, he won't say sheepishly, "Oh, I'm selling stuff for the Good Service Electric Shop." Instead he'll say with real pride, "Why, I'm associated with Sam Vining at the Good Service Electric Shop. It's a fine place. Come in and see **us** some time."

Which Door?

By Ken Hampton

"AT what door did you call, Jack?" asked a friend of mine of the third salesman.

"The **back door in the morning** and the **front door after 2:00 o'clock** in the afternoon," Jack quickly answered.

As salesmen will, we had fallen to discussing door-to-door selling. My companions, one a successful executive and the other the owner of a large appliance store, had both sold their way to success by calling on homes and selling appliances.

That remark is the keynote to successful planning and selling today. In home calls, you face the problem of getting attention enough from your prospective customer to get a hearing.

In the morning, the housewives are in the rear of the house washing dishes, sweeping, mending, washing or ironing or doing some other housekeeping task. Usually they are dressed in a working type of garment, their hair may be untidy and perhaps their hands are wet.

To answer the back door requires less effort and to them their personal appearance is less important as they regularly deal with delivery boys, repair men, etc., at the back door; e.g., people who serve them as you are striving to do.

It is amazing how many women will greet you at ease at the back door but will send you away without a hearing if approached at the front door when they are doing house work.

There is, of course, one great advantage of being invited in the back door because you step into the kitchen or porch where the appliances are, and you can easily discuss the advantages of new or additional appliances in relation to the ones now used. The housewife easily forgets any restraint because of her personal untidiness when both her interest and yours meet on the common ground of making her housekeeping task easier.

As a salesman, it is your job to get invited in and get the housewife interested in the appliance you want to sell. So, it is good sense to shift your approach into harmony with her habits.

In the afternoon, most housewives will have improved their personal appearance and will receive you at the front door with pride—but not in the morning.

Planning your selling involves knowing and taking advantage of the personal habits of people. Experience had taught my two friends the importance of varying their house approach habits to conform to the housewive's habits.

Much of the rest of their conversation was devoted to the importance of salesmen knowing and doing the little things that lead to success. Some of the things they discussed were the importance of—

1. **Always giving your name and the name of your firm immediately when calling.**
2. **Knowing and using the housewife's name when calling.**
3. **Stating the reason for your call early in your conversation.**
4. **Being alert to notice and comment upon the obvious interests of the housewife—compliment her particularly upon her housekeeping ability if you can.**
5. **Noticing, speaking to and talking about the children if they are present.**
6. **Noticing any pets and commenting on them.**
7. **Asking questions and finding out what she likes and dislikes about the appliances she uses and the work she does.**
8. **Taking every opportunity given to indicate the advantages of your product, especially how it will fit into HER habits and help serve HER problems.**
9. **Being honest and courteous.**

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

November 1949

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Too much has been written and said about the coal and steel strikes to waste any words here except that they certainly put a crimp in the appliance supply for months to come just when the business was rolling so well for everybody again. It is going to take ingenuity to get enough Christmas merchandise. This fourth round of wages or benefits will keep prices up next year after production resumes. Kicking UE out of CIO can generate some jurisdictional static as yet unannounced, too. It would take a radar predictoscope to see through the fog ahead of all business. Northern California Electrical Bureau's plans for some appliance promotions and an exposition are "indenfinitely postponed" until more merchandise is in sight. Things like that—

Strike out

Pretty big question in fundamental policy is in front of Water & Power Commissioners of Los Angeles. It's whether they are running a business or a minimum service. If they decide electricity takes a business to promote it they'll permit the city's utility management to run it as such and permit it to support the industry with ads, promotion, sales help, participation in So. Calif. Radio & Elect. Appliance Assn. and also industrial development. If not, the industry is in for a doldrums. See story next month.

Serious question

Hundreds of kids are ringing the doorbells in San Diego in a sensational Reddy Kilowatt Lamp Bulb Contest to make sales for dealers. Started Oct. 17 and ends Nov. 23 and the details are worth reading next issue.

Shines

Hawaiian Electric Co. has decided to divorce its retail sales from its public utility operations in line with an attempted law which was not passed but which dealers asked for. President Leslie Hicks announced that, Jan. 1, the merchandise organization, including its home economics classes, will be operated separately to remove all criticism of unfair competition with independent dealers.

Separation

Exclusive dealer contracts are being abandoned as a follow-up of the Supreme Court decision against Standard Oil of California. Anti-trust agencies are going after others. Frigidaire is rewriting its territory protection contracts as a result. There used to be a penalty for selling in an other franchised dealer's territory. No more. Nor can the manufacturer limit any dealer to buying only his line.

No more exclusives

A new gag for trick distribution, including appliances, is the "Billie Burke Family Club," which pays women commissions for selling their neighbors from a catalog. Many national brands have fallen for it. It cheats local licenses and sales tax, burdens that the dealer has to carry.

Slick trick

Phoenix's first TV station KTLX goes on the air this month and already dealers are out of sets to sell. In San Francisco KRON, the Chronicle station, put on a big contest, entry blanks for which had to be obtained from a dealer, for 12 TV sets. No. Calif. Electrical Bureau and TV distributors assisted in the deal to publicize KRON going on the air, Nov. 15. — Two new stations

Popular Ben Tassie, General Electric Co. appliance department Pacific District manager, former Manning Bowman executive, died suddenly of heart attack, Oct. 31, after addressing a sales meeting in Oakland. — Loss

L&H, (Lindemann & Hoverson) pioneers in electric ranges, are soon going to bring out a line of refrigerators and freezers under a trade name that uses its L&H initials, "Lectro-Host." — Hot to cold

Federal Reserve Board, our Washington office tells us, is scared there may be a new round of inflation after the strikes and wants Regulation W back again to keep installment buying in hand. — Oh oh

NARDA Trade-In Guide for 1950 is out and available from NARDA Guide Co., 20 No. Carroll St., Madison Wis., at $5 for the first copy and scaled down for more. Gives suggested trade-in allowances for refrigerators, electric and gas ranges, washers and vacuum cleaners. Is the official guide of National Appliance & Radio Dealers Assn. — Hold that line

North American Philips Co. will introduce a Holland-made electric shaver tradenamed Norelco soon. Is putting them on a 25¢ coin meter in men's wash rooms for daytime shaving. Should stimulate interest in electrics. — Dutch cut

Its income slipping, said Tide, Servel moved its president up, brought back W. Paul Jones from Philco to be president and try to develop a tough competitive angle to battle electric refrigeration for the market, so watch for gas explosive ads, strong pressure on air conditioning, direct-to-dealer distribution, new products. — Gas again

About men in merchandising--George Watson, former Manning Bowman manager, San Francisco, is affiliated with Incandescent Supply Co. in its appliance department. . . Don Linnard, former Thor sales manager, San Francisco, after a vacation in Hawaii may be found with a prominent manufacturer whose washer is very much like the one he was selling. . . Adrian Greenberg announces that A. D. Wunder Co., which he now heads, will soon be showing Marquette electric ranges and refrigerators, so he'll be back backing electric kitchens again. . . Charles Snyder, former WESCO man, is now appliance buyer at Macy's, San Francisco. — Men move

Given Mfg. Co., the Western maker of Waste King garbage disposers, Los Angeles, corrects us on some points rightfully, claiming to have an even shorter disposer unit than recently announced ones by a national manufacturer, and that 85% of existing homes is kinda high as a figure for easy installation without major plumbing change. Also tells of having sold Waste Kings to some large housing developments which are garbage free, every house in the area. — Still shorter

Rolph Stoddard has been made Western States regional representative in charge of Crosley TV and radio sales for the Crosley Division of Avco, headquartered at the new Crosley division offices in the San Francisco Mart. For the past two years he has been advertising and sales promotion manager for California Electric Supply Co., Crosley's northern California distributor. — New job

Television manual for dealers, published by the National Assn. of Electrical Distributors (formerly NEWA), outlines problems of installation and service, offers recommended procedures. Copies of "Manual of Experience" can be ordered for 25¢ each from NAED, 500 Fifth Ave., New York. — TV answers

Hotpoint's aim is to train 20,000 dealer salesmen by next summer with its ambitious sales training program the Payoff Plan. Sales building activity through weekly meetings in dealers' stores and a joint distributor-dealer training campaign are the two big phases. 52 weekly on-the-job meetings, foto-quiz, 52 sales builder bulletins, sound slide series, plan for selecting and training new salesmen, product feature evaluation, prize contest and new product announcement films will be provided. Full year's course will cost the salesman $5. Hotpoint supplies all materials. — Hot points

Football is doing a lot to boost TV sales. In San Francisco September sales reached 1,189, bringing total sales for the area to 13,000. . . Los Angeles broke its TV record during September with 26,496 sets sold, making an estimated 213,273 sets now in service in the area. — TV sales rising

TV sales are climbing all right, but not everyone is happy about it. Los Angeles Transit Line blames TV for a 25% decrease in nighttime streetcar and bus travel in L. A. Hints that TV has a lot to do with decreased bus-riding to sports events. — Blamed

California Electric Supply Co., San Francisco, showed dealers the 1950 Crosley line of freezers, refrigerators and ranges in October. Other showings were staged throughout the West. Big attraction was Crosley's expanded freezer line, a 7, two 12's, and a 20 cu.ft. model, with Shelvatrays, removable baskets, adjustable dividers, inside light and door catch. New Shelvador has one-piece moulded plastic refrigerated door replacing the aluminum finish, recessed for more front-row space. — What's new

Thor is out with a new combination sink, clothes washer and dishwasher, priced at $450. One mechanism and one set of controls operate both the dishwasher and clothes washer. Is converted simply by changing inner tubs on a vertical drive shaft in the left half of the sink unit; tubs store under sink on a swing shelf. — Three in one

American Central Division of Avco is making a limited offer on its combination deluxe sink and garbage disposer, offering both at a suggested price of $179.95. Campaign will last through November. Combination regularly sells at $279.90 — Offer

General Electric lamp department has put out a Christmas lighting package with ideas for conducting a lighting contest, and two publications-one on home lighting, the other on community lighting. — Christmas package

All glass rectangular television bulb is on the market now, made by American Structural Products Co., subsidiary of Owens-Illinois Glass Co. New bulb will make possible smaller TV cabinets without reducing the size of the picture. — Glass TV bulb

Sunbeam is putting out a new lighter weight Ironmaster (2½ lb.) with an aluminum alloy soleplate. Other features are identical to the 4 lb. Ironmaster with hard steel soleplate. Retail price is $12.95. — Lighter iron

Westinghouse is featuring the "electronic magnifier" and built-in antenna on its latest TV models. — New features

New Christmas tree lighting set called Ad-On Lites is made by Sproco Mfg. Inc., Gardena, Calif. Each single string is an outlet for two additional strings. All stay lighted when one bulb burns out. — Holiday lights

Boyd Distributing Co., Denver, won first place in a nationwide Motorola radio contest recently. Besides the Paul Galvin Trophy the firm won $2,000 in merchandise prizes. — Winner

Admiral's president Ross Siragusa foresees a "black market in TV sets in the popular price range" by Thanksgiving. The industry is making as many sets as it can, he declared, but manufacturers and distributors don't have stocks on hand. Recently in Los Angeles Siragusa announced that Admiral may set up an assembly plant in L. A., first for TV, later it will make appliances too. . . Admiral recently announced three new TV receivers, a TV-radio-phono combo at $299.95, a console with 12½-in. screen at $279.95, and a table model with 12½-in. screen at $249.95. — TV forecast

Gibson brought its 1950 line of refrigerators, ranges, home freezers and promotional material to San Francisco Oct. 24-25 to show Western distributors and their salesmen. Pres-Toe refer with foot pedal door opening, Touch-A-Tap refer with built-in drinking water supply, push button ranges, and a 10-cu.ft. chest type freezer were the highlights. H. R. Basford plans a Gibson dealer showing soon. — Out West

Cory Corp. is supporting its fall "guaranteed against breakage" sales campaign with national advertising. Breakage policy applies to all Cory glass coffee brewers. — Backing

John Meck Industries has set up a replacement policy for its radios requiring new parts or repairs. When customer brings radio to his dealer for repair he'll be given a new set immediately. Dealer simply returns receiver to the Meck plant where it is reconditioned for resale. . . Turnquist Bros. Co., Los Angeles, has taken on exclusive distribution of the Meck television line for the Los Angeles area. — Trade in

Taylor Corp., Alliance, Ohio, has added the "Summer Breeze" automatic clothes dryer to its line of small home laundry equipment. Dryer is equipped with ultra-violet germicidal lamp and drying rack so flat pieces can be folded to eliminate ironing. Retails at $129.95. — Dryer

Frigidaire has a new 12-cu.ft. food freezer on the market featuring an independently powered alarm bell that warns if cabinet temperatures rise 5 to 10 deg., and an adjustable cold control for regulating temperatures. Automatic interior light in cabinet top illuminates food storage compartment. — Warning bell

Perfection Stove Co. has introduced an electric range with adjustable fluorescent lamp which slides up or down, deep-well cooker which raises the heating unit without the use of hooks or tongs, warming drawer, white porcelain enamel oven lining. Controls are spaced on the splasher back. — Range features

Hotpoint's latest additions -- an 8-cu.ft. refrigerator, two combination refrigerator-freezers, 8 and 10 cu.ft. Will have an 11-cu.ft. freezer on the market in December. 1950 range line will feature a new pushbutton model, three conventional and two apartment size models. One innovation on its existing pushbutton ranges will be a new "instant heat" Calrod unit for high-speed cooking. . . Big attraction on its new "ready-plumbed" automatic dishwasher is that water from the dishwasher is pumped into sink drain connection, eliminating special plumbing when machine is installed. — New ones

IT'S SET UP FOR SALESMEN

WHEN Goddard's in Yakima, Wash., set its 1949 sales goal at $600,000, President Ken Goddard knew it was not only an ambitious quota for a small appliance retailer, but that it would take hard selling and cooperation from his eight salesmen to realize a $100,000 increase over last year's volume.

Believing that the backbone of a successful business is in a strong selling organization, Goddard has developed a store policy built around salesmen satisfaction. Through a cooperative ownership plan worked out by Goddard last year, each salesman automatically becomes a stockholder in the business after one year with the store.

"The ramifications of this system are numerous and beneficial. Our salesmen are trained in the appliance business, we have little turnover in personnel and the men have a real incentive to work since we all share in the profits," says Goddard, who has operated the store since 1932.

To keep the salesmen abreast on all selling techniques, the store holds sales meetings twice weekly, headed either by Goddard or the store's energetic vice-president and general sales manager, Bliss Ingalsbe. When the store is running a special promotion, one sales session is scheduled immediately before the campaign breaks and is devoted entirely to pertinent selling points to stress in the promotion. Slides showing selling techniques are often used to augment the sales story. These informal evening sessions give the salesmen an opportunity to air their gripes, offer suggestions and exchange ideas.

Goddard believes that close distributor cooperation is an important factor in the over-all operation of the store and specifically in helping the salesmen in their job. Frequently distributor specialists are on hand during the sales meetings to give a sales pitch on their product and to help the men in selling during special promotions.

Using a personal incentive for each salesman to strive for the $600,000 sales goal, Ingalsbe has worked out a sales contest for both Goddard salesmen and service personnel, based on individual sales throughout the year.

Setting the total goal for the salesmen at $400,000, each man's quota is $50,000. The salesmen's daily progress is recorded on a large chart painted on one wall in an annex off the store's main display rooms. Automobile cut-outs with the names of the salesmen reveal at a glance where each stands in the contest. On the opposite wall a separate chart shows the progress of the service personnel, including the office force, whose combined goal has been set at $200,000. Goddard's service personnel receive credit for all prospects they turn in.

Leading salesman Philip Boyd, left, watches Bliss Ingalsbe record his progress on the sales contest chart at Goddard's. Contest gives both salesmen and service personnel individual incentive for reaching store's $600,000 goal for 1949

Total value of the prizes to be awarded at the end of the year is $6,400. Top award will be a Plymouth automobile, second a $750 television-radio set, third a General Electric all-electric sink, including dishwasher and disposer, fourth a home freezer, fifth an automatic washing machine, and the next three prizes a suit of clothes valued at $100. Prizes for the service personnel will be the same with the exception that no car will we awarded.

To promote lamps actively, Ingalsbe has worked out an attractive plan including lamp sales in the contest. For every $1 worth of lamps sold the salesman receives five times the dollar credit on the sales chart. Lamps include all General Electric floor, sun and germicidal types.

Strengthening the store's efficient sales force is its equally efficient service department, an integral part of the selling policy at Goddard's.

Employing ten men, all specialists in their field, the service department is made up of one service manager, three radio men, three service men, three delivery and crating men. Quick and thorough service is provided by the department, which maintains a complete supply of parts to meet almost any job. Before delivery to the customer, each appliance is carefully inspected and pronounced in perfect working order. This phase of the store's operation gives the salesmen confidence in selling their product, in backing it up with a sound service policy and in creating good will among the customers.

So far Goddard's salesmen look like a good bet for reaching the store's $600,000 goal. Sales volume for the first six months is equal to the same period last year, and since the store's largest volume is realized during the last quarter of the year, chances are good they'll make it.

ELECTRICAL WEST

Stable Business Means Stable Jobs

IT IS generally recognized that the American enterprise system cannot survive another era of boom and bust. The last major business recession proved that premise. Hence all business might well guard against policies or practices which tend to disrupt economic stability. Violent business fluctuations with consequent cyclical unemployment play into the hands of the bureaucrats. A workman without a job is fair game for the collectivists. So it is up to industry to keep men working.

Extension of the recent slump which hit manufacturers who sell to the utility companies won't keep people working. When the material shortages of a few months ago evaporated and when prices slackened, many utilities abruptly stopped buying. Over-buying had built up high-priced inventories. When buying ceased, many manufacturers saw backlogs vanish and red ink show up on the balance sheet.

If these companies are forced to curtail production sharply and let workers off, who will be blamed? The manufacturers? Perhaps not. Workers know that when the utilities are buying, factories are busy and jobs are assured. Isn't it possible then that the utilities will get some blame?

Under the circumstances it would appear that a better coordinated job of planning, purchasing and inventory control is desirable. That would be a real contribution to industry stability and job security.

Contracting and Politics

AT the national convention of the electrical contractors association at Houston as this goes to press will be waged the biggest political battle in that organization in years. Contending forces have complicated it so that it is hard for any ordinary contractor to find his way through the maneuvers, claims, charges, innuendos and smoke barrages. And that is why most ordinary contractors are not bothering themselves to be there or to participate.

For contracting is, except for the big "gypsy" contractors who skip over the country to pluck the big projects, a local sort of business. Only since the war have national and labor politics moved into it and completely befuddled it. Most of its biggest headaches and difficulties spring from trying to handle on a national scale things that were always handled better at local levels—such as relations with the working electrician, pensions, vacations, etc. From the remote national point of view such details as local economic conditions, are seldom seen and hence not appreciated.

Contractors, like everybody else, would do better by getting down to the ground level again. That stratosphere stuff is intoxicating but leaves hangovers and headaches.

What's Happened to Ethics?

WHILE viewing with alarm some of the recent developments on the national scene, folks in the electrical industry are overlooking a few internal self-indulgences. The apparent moral disintegration of the American people that is sending the country hell-bent down the road to statism is but little worse than the current wave of repudiation of sound business ethics in this business.

One of the principal evidences of this dissolution is the growing tendency to sell goods and services below cost. To sell goods at a price which does not return a fair profit—either deliberately or through ignorance—is to invite disaster. There are only two reasons for such a course. Either the goods or services are not worth the price originally asked; or the sales story of the seller is not as good as that of his competition.

Experience will show that most moves for a price concession originate in the mind of the prospect or purchaser. If he is a smart buyer he infers he can buy for less or he deliberately asks for a better price. Usually he is simply testing the salesmanship of the seller. Then the salesman tries to alibi a poor selling job with his sales manager by insisting that the only way to get the business is to cut the price.

A seller who deliberately cuts prices below a fair margin of profit does three things: (1) He lowers his organization in the esteem of the buyer ultimately to a point where the latter loses confidence in him. (2) He tears down his whole industry to no good purpose. (3) Ultimately he goes broke if he persists.

EDITORIAL VIEWS

It's a truism that the only agency that can consistently run a business and not make a profit is government. Only it has the backing of the public treasury. If organizations in the electrical industry, whether they be contractors, distributors or manufacturers, continue to ignore sound business principles, they are simply hastening the day when the government will be running our business. It's a sure and certain invitation to socialism.

A Landmark to Enterprise

ELSEWHERE in this issue is a review of a book that tells the saga of the Big Creek project in the High Sierra. The book has great significance, for it narrates a story of what may well be the finale of a challenging American era of enterprise and initiative. On Big Creek "straight-thinking, hard-working Americans of the old school" built a series of dams, tunnels, conduits and power houses that wring the last measure of energy out of every drop of water through a fall of more than a mile. In all of this none of the water is consumed. Ultimately it irrigates the parched land of the San Joaquin Valley.

The real significance of the book (and for that matter, the story of the Pit, the Feather, the Bear and the Snake) is put into cogent words by Edison President W. C. Mullendore. His preface says:

"Here again is a stirring and inspirational example of the work of free men, self-reliant men, men who did not wait to have society or government underwrite the risk.

"Today, Americans perform equally great miracles of construction but too often we turn to 'government' to underwrite the risk, parroting a stultifying statement to the effect that the undertaking is 'too big for private enterprise.'

"This is a story of the older America—a brilliant example of the courage and vision of men who never thought of asking government to underwrite their risk because it was 'too big' for them as private citizens."

We commend the book to the younger generation of engineers. It may revive in them some of the spirit and enterprise of the people who pass through its pages.

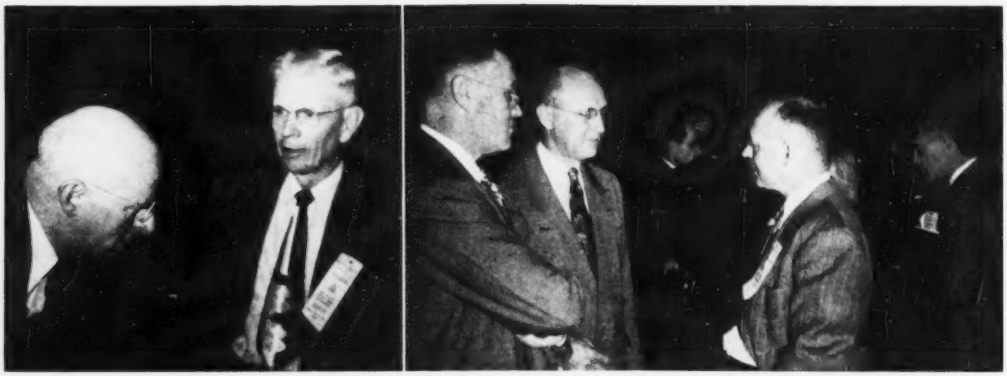
A Changed Situation

IT may come as a shock to many utility people but things have changed since last they were the active leaders in selling, promotion and load building. Instead of leading the trade it is now the trade that is leading them. The appliance industry which they nurtured as an infant has grown into a big industry that stands on its own feet. All that it asks of the utility is plenty of electricity to make the stuff it sells operate. It is no longer "load building."

Similarly the appliance industry is leading the contracting and supply branches of the industry into the domestic market much more than their own efforts are doing. In order to make the electric kitchen and laundry work and to light the modern home, with no help at all and even some obstacles by the contractors and unions, the appliance industry and the electric user is demanding more wire, more outlets, more lighting equipment from contractors and distributors.

It is *the electrical way of life* that is moving ahead and nothing can stop it.

PROPONENTS of a CVA and especially those who are on the government pay roll, are very impatient with the processes of representative government. They dislike having to come to Congress with their requests for money . . . They seem unwilling to sit down around the table, like ordinary citizens, and work out differences of opinion about their plans and programs. In brief, they don't act half as interested in trying to make our present system of resource development work better as they are in setting up an entirely new system which they, and they alone, will control. There is no short and easy method of self-government. Every nation that has attempted to take short cuts away from the winding path of democracy has wound up with state socialism and dictatorship. The short cut never leads back to the trail.
—Douglas McKay, Governor of Oregon.



Hooper Neilson Kieley Ritt Willingham Tucker

Independent Contractors Get Together

IF competition is part of the American way, then association competition is healthy too. So said T. Ralph Neilson, its manager, to the third annual convention of the Electrical Contractors Society of Washington which brought together at Wenatchee last month a large representation of independent electrical contractors associations. Besides the Washington Society there were the Idaho State Electrical Contractors Assn., the Pacific Electrical Contractors Assn. of Oregon and a large delegation from the Midwest Electrical Council, members and officers from its Minnesota, North and South Dakota affiliates.

Their problems were as alike as quintuplets. Their dissatisfaction with the National Electrical Contractors Assn. was shared alike. It centered on the same gripe—NECA's deal with the IBEW which had forced the pension fund plan on every contractor, like it or not.

While this underlying antagonism was not in the convention program, it emerged in the executive board meeting and the Sunday closed session. There also was general contention that NECA had become a "big contractors'" organization, that its alliance with labor was collusive, that the union has made threats and used pressure, all of which were resented.

But the regular program, all day Saturday Sept. 17, was compact, constructive and, like many such things, should have been heard by far more than were present. Wenatchee contractors, under George W. Sperline, convention chairman, and P. D. Winter, president of Wenatchee Chapter, and the community outdid themselves in hospitality. It even furnished Congressman Walt Horan, who warned that America is within seven per cent of the critical tax burden point beyond which totalitarian rule begins; and Rufus Woods, local newspaper publisher and blind advocate of government power development and CVA, as opposite pole speakers at the banquet. Don L. Black, Everett, Wash., contractor, Society president, conducted the meetings. T. Ralph Neilson, manager, ably handled arrangements and program.

Challenging talk given by A. R. Wooley, Pocatello, president of the Idaho association, is presented in full.

Hewitt

page 79. Others who addressed the group were:

Mayor Arthur Pohlman, who welcomed business men in free enterprise; so many groups he welcomes are tax supported.

C. F. George, manager, Chelan County PUD, who advised, since contractors no longer deal with rules of one large company over a wide area, they should become acquainted with rules of each PUD. His PUD asks contractors to do their work safely, well, and learn the utility's requirements and rates.

Lee Matney, former Washington state electrical inspector, now consulting engineer, introduced his successor, John C. Hewitt. Hewitt assured contractors of equal treatment, mentioned deficiencies in the present state law. His local deputy, Delanty Carr, said there was a lot of home owner wiring. It is one right that can never be taken away.

A. H. Gudie, Biddle Trade Bureau, Los Angeles, conceded there might be need for a grass-roots organization of contractors but asked that NECA be given its due. It has accomplished much. He advocated a stronger financial backing by contractors to give the association respect and facilities. In negotiations, he urged, contractors should make a number of demands, too.

G. R. Stuntz, legal counsel for the Electric Heating Assn., who charged that private and public utilities were "doubling their rates" for electric heating and hurting a service the public wants. He asked the group to join in protesting to the Public Utilities

Commission any five-year ban on electric heating load.

Clere Alger, representing Electric Club of Washington, outlined the Adequate Wiring program being sponsored by the club and asked participation in it to all contractors' benefit.

William A. Ritt, St. Peter, Minn., is one of the founders of the Midwest Electrical Council, with which the Society has affiliated itself. Ritt reviewed the position of the contractor dealer from early times, described how the local associations in Minnesota formed a council which was joined later by similar independent associations from nearby states. He outlined the broad and constructive program carried on to: (1) Make use of all national sales promotion programs such as Adequate Wiring, Modern Kitchen, Better Light —Better Sight, etc.; (2) improve inter-industry policies between contractor dealers and suppliers, utilities, manufacturers, inspectors; (3) awaken contractors and dealers themselves to their responsibilities and opportunities; (4) take advantage of new products and developments, such as fluorescent lighting; (5) create favorable economic conditions in which contractors and dealers can grow and render better public service. Gordon Tucker, manager of Midwest Council, followed up by describing the forms, books, bulletins and services made available to members.

J. Carl Baldridge, secretary, Idaho association and state electrical inspector, followed Wooley's talk, with a frank appraisal of conditions in that state. He reviewed the effort made to get the state law improved, an effort that almost had it repealed instead. Inspection, he hoped, could be increased through a cooperative plan with small cities unable to finance their own inspectors.

W. A. Cyr, associate editor, ELECTRICAL WEST, gave the talk, "What an Association Can't Do and What It Can," that was published in full April 1948.

Ray Larrabee, Underwriters' Laboratories, Seattle, described tests and procedures used in checking the safety of electrical devices. He also assured contractors that standards on switch equipment were being revised to eliminate the causes for overheating of which there have been complaints.

Chester Kirsop, Olympia city inspector and third vice-president of International Association of Electrical Inspectors, had three things in mind: (1) Relation of contractors and inspectors should be helpful to each other, not collusive or showing favoritism, but cooperative and understanding, because, (2) the public expects a great deal from both, is a hard taskmaster to both, demands a full dollar's worth. (3) Both should strive for more public protection by improving legislation for inspection and by education. Legislation failed to pass last legislature because of factions and dissension.

Coats Ingle Siegal Black

Black Wooley Baldridge

Art Siegal, Sela Electric Co., Seattle, was elected president; George Sperline, Wenatchee, first vice-president; Fred Ingle, Sound Electric Co., Seattle, second vice-president, and Sydney Coats, secretary-treasurer.

NWEL&PA

Northwest Electric Light & Power Assn. will conduct the usual conferences of its Engineering, Business Development, Accounting and Personnel sections in the spring of 1950. Preliminary plans of the section chairmen were heard and approved by the executive committee meeting in Portland, Sept. 16.

Business Development Section, with Earl Olson, Idaho Power Co., chairman, received an invitation from Montana Power Co. to meet in Butte. This idea was accepted favorably. It will be the first time the section has ever met there. Details and dates of this and other section conferences will be decided at section executive meetings.

A change in the method of operating Research Advisory Service was outlined by association executives at the executive meeting. Under this plan, new problems will be processed and solutions reported through the industrial departments of the member companies. The association office will continue to maintain the library of reports, which will be available to the member companies on order. This service, which has been in operation a little over three years, undertakes to find answers to business and industrial problems for the customers of the participating member companies. It is offered free to these customers by the companies. It was brought out at the meeting that the service had produced reports on about 400 problems submitted to it from all parts of the northwest territory. Many of these reports have been found useful to industrialists other than the originator of the problem. The service is offered as an adjunct to the industrial development work by the several companies.

Inspectors of Two Sections Discuss Code

WITH a number of hours devoted to discussion of proposed code changes, a goodly smattering of technical and inspirational talks, the customary reports of officers and chapters, and the election of officers for the coming year, the 23rd annual meeting of the Northwestern Section, International Association of Electrical Inspectors, went down in history at Butte, Mont., Oct. 3-5. Ralph R. Grant, city electrical inspector, Havre, Mont., presided, and the local committee, headed by Earl Hoff, Graybar Electric, Butte, registered 240 delegates and put on a round of entertainment that delighted the visitors and made their brief stay on "the richest hill on earth" one long to be remembered.

At the final business session, D. J. Wolters, electrical inspector, Salt Lake City, was elected president, with L. B. Garff, Tacoma, as first vice-president, and Chris Klawa, Portland, as second vice-president. W. L. Gaffney, city electrical inspector, Tacoma, was re-elected secretary-treasurer, and the following were named on the executive committee: Harold W. Rising, Nampa, Idaho; John Crawford, Butte; O. A. Alderman, Seattle; R. A. Church, Seattle; T. M. Widrig, Seattle; J. Hyde Stayner, Salt Lake City; Ralph Grant, Havre.

Seattle was chosen as the place for the 1950 annual meeting.

The meeting got off to a good start with a hearty welcome by Governor John Bonner of Montana, and response by Herbert G. Ufer, Underwriters' Laboratories, Los Angeles.

In his presidential address, Charles A. Ward, Patterson, N. J., discussed the operational problems and finances of the International association and stated that its chief object should be to improve the standards of the National Electrical Code so that it becomes a code which can be accepted nationally as a minimum standard by all inspection jurisdiction, be they national, state, municipal or insurance. President Grant in his address made a plea for harmony in all phases of American politics and business, saying our differences must be thought out, not fought out. Americans have done a poor job of selling the truth, he said, against advocates of alien doctrines who have been quite successful in selling lies.

The report of W. L. Gaffney, secretary-treasurer, found the association solvent and healthy.

All the chapters were heard from in turn, including Idaho, by H. W. Rising; Utah, by A. E. Fleming; Puget Sound, by C. S. Alger; Tacoma Division of Puget Sound, by L. B. Garff; Montana, by W. S. Lindsay; Oregon, by O. T. Fugitt. The Oregon Chapter, newest in the family, had its organizational meeting in March and received its charter in May of this year. An application was received for the formation of an Eastern Washington Chapter and the executive committee of the Northwestern Section had approved. The Seattle delegation likewise announced its intention of forming a Seattle division of the Puget Sound Chapter.

Charles L. Smith, secretary of IAEI, appeared on the program twice, covering different subjects. He touched on association administration and finances, stating that one of the recommendations made for increasing association income was to create a new class of membership for towns, cities and municipalities, with dues commensurate to population. On the subject of code revision, he compared the old method with the new method, having an electrical section of NFPA, and code-making panels and correlating committee. He declared the new method brought a broader and more accurate cross-section of the industry to bear on code-making problems, and a more scientific method of revision.

Ward Smith

In his second appearance, he told of the proposed revision of recommended safe practice for hospital operating rooms, as developed by a special committee of the NFPA. This report showed that a study of the hazard had led to the conclusions that the greatest degree of safety can be secured only by coordinated treatment of all significant factors, rather than by the application of individual and unrelated safeguards. The report covered an outline of the nature of the hazards, construction of operating rooms and equipment, including electrical wiring, and administration.

Two code breakfasts, one chairmanned by L. B. Johnson, General Electric Co., Salt Lake City, and the other by Ray J. Larrabee, Underwriters' Laboratories, Seattle, presented the opportunity for general discussion of code problems and interpretations. Reports of panel committees and proposed code revisions were heard at three panel sessions in which the panel consisted of: R. J. Larrabee, chairman; C. S. Alger, Puget Sound Power & Light Co., Seattle; C. E. Crowley, electrical engineer, building department, Seattle; C. M. Kirsop, electrical inspector, Olympia; J. H. Watt, electrical inspector, Seattle; W. R. Volheye, state electrical inspector, Portland; Charles L. Smith and W. L. Gaffney. Recommendations for revisions evolved through these panel discussions will be sifted through the executive council.

A solution to the problem of cooperation between privately owned utilities and federal power plants, to gain the maximum of benefits to the most people with a minimum of both private and public funds, was expounded by J. E. Corette Jr., vice-president, Montana Power Co., in an address at the annual banquet. He suggested that private utilities plan and schedule the construction of their generating plants in such a way that they will be in a position to furnish market for the power developed at the federal projects, if and when those generating units are installed. Private utilities should build the transmission and distribution systems and these would be without cost to the taxpayer and without injury or detriment to the millions of American people who are the owners of the private utility business. These power systems could be used to deliver to all the people of the area all the government power that could be produced at the federal project, and in such a way as to give full effect to all the provisions of the federal law relating to public power.

In an entertaining hour and a half, Sam Roach, head of the research department, Anaconda Wire & Cable Co., New York, told of the importance of synthetics to the world of the future, dramatically and with demonstrations. The frontiers of today, he pointed out, lie in the research laboratories and in the imaginations of men, and there

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Means longer life at heavier loads

Anaconda has come to mean "keeping-ahead-of-the-parade." For example, the history of Type CB cable with resilient binder and F-3 alloy-lead sheath is a case in point. Its acceptance in the trade has been most gratifying. That is what happens in a company whose engineers are never satisfied with *anything*.

In 1939

Anaconda engineers introduced Type CB cable because ordinary paper-insulated cable wasn't good enough. Carbon-black paper removes oxidation products from the insulation, eliminates ionization discharges. These and other desirable properties increase insulation stability and assure longer cable life.

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Anaconda engineers added the resilient binder for they had found a way to reduce sheath strain during daily load cycles. Made of special carbon-black paper, it is strong yet resilient, results in lower stresses in the sheath due to cushioning effect, conducts radially and is fully adequate against magnetic forces.

In 1944,

because they know cable life often is shortened by premature sheath failure, Anaconda engineers gave this Type CB cable the amazing F-3 alloy-lead sheath. It is the best all-around alloy ever offered in the industry . . . resists slow-bending fatigue, creep (expansion), bursting, abrasion, vibration fatigue and does not age-harden . . . actually extends sheath life more than three times ordinary sheath. It has truly earned the name "indefatigable."

THIS COMBINATION permits heavier loads for longer life!

*CB—Carbon-Black, Trade Mark Registered U. S. Patent Office

**F-3—Arsenic-Lead Alloy (U. S. Patents 2,300,788 and 2,374,755)

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seems no limit to the benefits that flow from those who are pioneering these frontiers. The discussion was largely on the substances making up present-day synthetic insulations and prospects for the future in this field.

A. E. Fleming, General Electric Supply Corp., Salt Lake City, discussed the unusual grounding problems involved in the prevention of explosions through the discharge of static electricity in operating rooms. Most of the commonly used anaesthetics of today are highly inflammable or will support combustion, and the problem of eliminating this hazard has been the subject of much study.

In outlining the development of fuses from 1893 to 1949, Paul Heffelfinger, Chase Shawmut Co., Wawatosa, Wis., explained the triple protection offered by the dual element fuse called Trion and the Amptrap, a current limiting device having high interrupting ability.

J. L. Wagoner, Westinghouse Electric Corp., Pittsburgh, stated that adequate wiring is safe wiring. He demonstrated by mounting a number 18 and a number 12 circuit on a panel board with instruments to indicate voltage drop on various loads, and pointed out the effect of voltage drop on the operation of lamps and appliances. He showed how easily a fire could start from a heated circuit when a blown fuse was coppered in with a penny.

Under the subject "What IAEI membership has meant to the H. N. Robertson Co.," Joseph J. Siddall of that company in Pittsburgh stated that membership of the manufacturers has privileged them to work closely with the inspectors, to the end of producing better and safer materials, and has fostered a desire among manufacturers to maintain the standards set for safer and more economical methods of wiring.

In a paper on "Electrical House Heating," Howard H. Weber, U. S. Rubber Co., New York, discussed the theories of different heating methods applied to deliver human comfort. With convection heating, the heat source maintains the air temperature, thereby preventing heat loss from the body under existing conditions of humidity and cool surrounding surfaces of the room. With radiant heating the object is to maintain an average temperature of the surrounding room surfaces, preventing excessive heat loss from the body by radiation. Under the latter condition, comfort can be obtained by maintaining a lower air temperature. He discussed the various methods of providing radiant heat: by circulating steam or hot water in pipes in the walls or floors, by circulating hot air ducts in the floors and walls, by embedding electrically heated cables in the plaster of ceilings and walls, and by means of electrically heated panels located in the ceilings and side walls. The electrically heated unit panels containing conductive materials, as manufactured by U. S. Rubber Co., called Uskon, were described.

Inspiration was found in an analysis of present and prospective economic conditions in the country by Gordon Colwill, Graybar Electric Co., New York. Illustrated by slides and amplified by statistical material on building construction, past, present and prospected, Colwill's talk prophesied a continuing higher level of activity in electrical development. This is particularly true, he said, in view of the new utilization devices being brought forward to contribute to human comfort in living and to economic savings in industry.

Siddall Briegel

T. W. Briegel, Briegel Method Tool Co., Galva, Ill., showed the NAM moving pictures, *The Price of Freedom*, a good story illustrating some of the dangers faced by the American political and free enterprise economic systems.

Discussing the importance of having standard laws and ordinances for the regulation of electrical installations, Henry M. Dreher, NEMA, New York, stated that deviations from the standard such as are sometimes put into effect in various cities, cause confusion for inspectors, and in some cases deprive the public of the full opportunity for using electric service. The new method of revising the NEC and the issuance of supplements thereto emphasized the desirability of standardizing on the NEC for all inspection jurisdictions, since these revisions take care of progress made in the art of supplying electric service to the public.

In a paper on "Motor Control and Its Relation to the Code," J. A. Setter, General Electric Co., Denver, pointed out that the code requires two types of protective devices for motors and the branch circuits to which they are connected: thermo relays to protect against overload and fuses or circuit breakers to protect against short-circuit currents. These are now provided in one piece of apparatus and Setter described the magnetic full-voltage combination starter which includes a line contractor with built-on thermo overload relays and a fused motor circuit switch to provide disconnect means and short-circuit protection.

The new director of Safe Electrical Cord Program of NEMA, Harold H. Wright, told of picking up the threads of the program, temporarily halted by the death of the previous director last May. The program includes direct mailing of letters, brochures and booklets, including invitations to lamp manufacturers, lamp and appliance manufacturers, urging their use of the flag label, suggested advertisements and publicity releases to insurance companies, and the distribution of the booklet *Electrical Safety in Every Room* for general distribution. Methods for getting the most out of this material were suggested.

Underwriters' Laboratories has resisted the efforts of some manufacturers to pull standards down to the "just good enough" level, said H. G. Ufer of that organization in Los Angeles in a brief discussion of the work of the laboratories. He welcomed continued constructive criticism from inspection departments to revise or change requirements as such revisions are found to be needed, and to keep standards up to date.

Among resolutions passed at the close of the meeting was one recommending that the last week of April of each year be set aside in the Northwestern Section as Electrical Safety Week, and the concurrence of other sections in such a program was asked. This resolution was presented at a suggestion found in the report of the public relation's committee by Captain Stephen E. Sanislo of the Seattle Fire Department, chairman of that committee.

Honorary Membership for James S. Mahon, Chicago, was unanimously approved.

Among extra curricular activities were scheduled trips along the Copper Key Trails, which circulate through the mines on the hill, trips underground into the mines, a trip to the largest smelter in the world at Anaconda, and a trip to the Lewis & Clark Caverns of Montana, near Butte. Cocktail parties, a smorgasbord dinner, the annual banquet and entertainment, and the annual golf tournament for the men, with bridge luncheon, shopping tours and sightseeing for the ladies, completed a full program.

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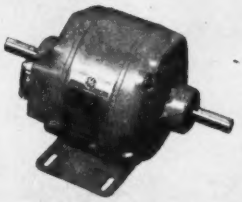

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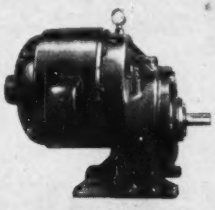
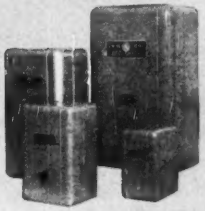


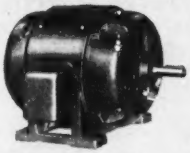
INTEGRAL HORSEPOWER GEAR MOTOR

GENERAL PURPOSE THREE PHASE

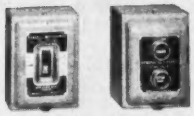
SINGLE PHASE



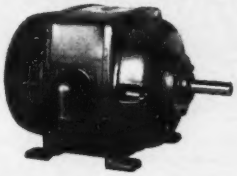
ENCLOSED MAGNETIC A-C STARTERS



SINGLE PHASE—KC INTEGRAL HORSEPOWER



TOGGLE & PUSH BUTTON MANUAL MOTOR STARTERS



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ENCLOSED COMBINATION MAGNETIC STARTER

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Southwestern Section at San Diego

MAIN difference between the Southwestern Section, IAEI, and its Northwestern Section neighbor lay in the code discussion and breakfast topics. For President Ward's address, those of Charles L. Smith, IAEI secretary-treasurer, Chicago, and of J. J. Siddall, Paul Heffelfinger, H. M. Dreher, and T. W. Briegel were the same as those given at the Butte meeting, reported in the foregoing. The Southwestern Section meeting at San Diego, was directed by Jesse K. Ross, city electrician, San Bernardino, its president, and the local arrangements were in charge of Arthur Vesco, chief electrical inspector, San Diego, and an able committee.

In welcoming the convention, L. M. Klauber, board chairman, San Diego Gas & Electric Co., said the utilities rest their case with the inspector to see that the customer can install wiring reasonably and use electricity safely. Even Councilman Kerrigan admitted to having been an electrician once. R. B. Maxwell, the section's first vice-president, responded to the welcomes.

Ross, in his presidential address, urged inspectors to operate as a good business would. "First, know your product, which in our case is our knowledge of the code. Second advertise your product, which is the manner in which you inform and explain the requirements of your code to obtain the best cooperation from the person who is paying the bill and who sometimes wants to know *why*."

There was one morning session at which G. E. Manning, superintendent of label service, Underwriters' Laboratories Inc., Chicago, first described the types of labeling and listing provided manufacturers and then answered questions from inspectors and received suggestions from them for improvements to some services. Manning assured the group that the enclosed switch and panelboard standards were being revised to recognize the wiring space and heating complaints received. Many of the troubles discussed were due to misuse of equipment listed for use under specific conditions in applications for which they were not intended or listed.

The fire and accident report, given by Harry V. Dobson, Santa Barbara city inspector, made special comment on the prevalence of fires in overheated motors. Further comment that motors containing inherent thermal protection seldom give trouble was made. Most of the fires reported due to electric wiring could be traced to misuse of cords, not the basic wiring, it was stated.

Art Vesco, local chairman, at banquet, surrounded by national and section officers, turns program over to "Pancho" Leon Guiberra, in sombrero at right

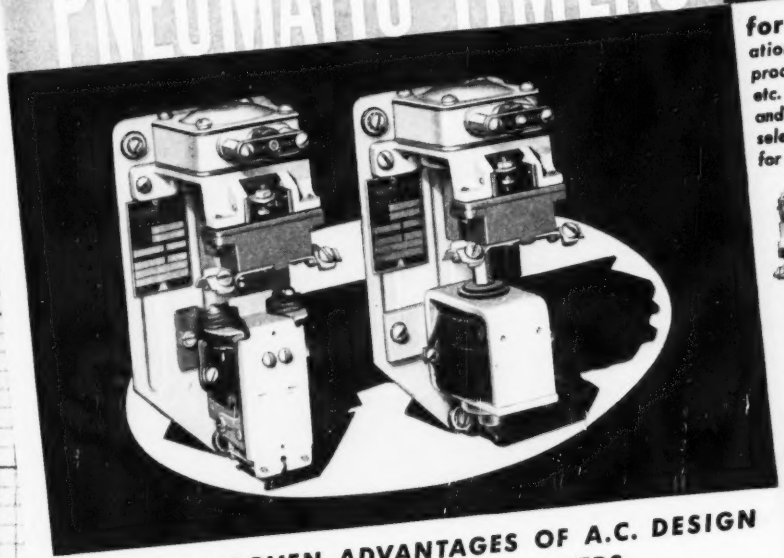
Maxwell Muller Johansen Ufer

At code breakfast sessions one hears what the inspectors themselves are concerned about. Topics covered at the two breakfast sessions, chairmanned by Arthur Vesco and Walter Keller, Santa Cruz inspector, included: a demand that the time limit as to requiring fittings that automatically disconnect high-voltage lamps on lamp removal be enforced; overlamping of recessed ceiling fixtures which increases heat beyond what fixture are approved for; interpretation of what is meant by use of fluorescent fixtures as a raceway; switching means at transformers serving neon or high-voltage discharge tubing; deficiencies of armored cable or flexible cable connectors. Questions were also asked as to when washing machine manufacturers were going to equip machines with three-wire cords and grounding receptacles to fit the now code-required grounding receptacle. The answer given was that they were working to further insulate motors instead.

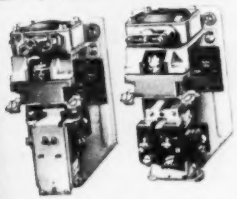
Among code changes voted passed on to the Electrical Section of NFPA through IAEI channels were: a request to eliminate bare bus riser systems as hazardous and inefficient; switch requirements at neon transformer locations; guarding of crane collector wires similar to California State Safety Order requirements. Theater and auditorium emergency lighting was also referred again for action in the next code. Smith assured the group that wiring for drive-in theaters, hospital and theater emergency lighting and an investigation to see whether the "may," "recommended" and "special

Main event—Bull fight; El Toro Tony Goulart vs. Toreador Leon Guiberra

PNEUMATIC TIMERS FOR EVERY JOB A.C. or D.C.

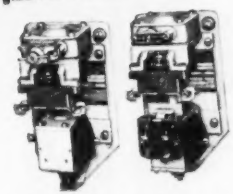


for timing motor acceleration, machine sequences, process industry operations, etc. With wide variety of A.C. and D. C. timers, you can select exactly the right one for any given job.



above, left
A. C. Time delay after de-energization. Micrometer dial.

above, right
A. C. Time delay after energization. Electrical interlock.



above, left
D. C. Time delay after energization. Micrometer dial.

above, right
D. C. Time delay after de-energization. Electrical interlock.

THESE PROVEN ADVANTAGES OF A.C. DESIGN NOW FEATURED IN NEW D.C. TIMERS

ACCURATE—less than 10% variation, plus or minus, from mean timing period. Unaffected by normal changes in voltage and ambient temperature.

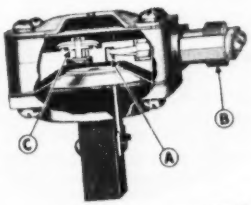
WIDE RANGE—timing period adjustable, 0.2 seconds to 3 minutes.

EASY TIMING ADJUSTMENT—quick fingertip setting of knurled knob or micrometer dial.

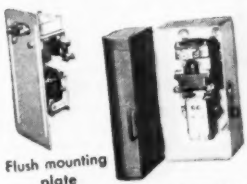
SNAP ACTION CONTACTS—normally open and normally closed in self-contained, arc-resistant melamine case—rated for A.C. or D.C. control circuits.

ELECTRICAL INTERLOCKS—operated by the magnet which actuates the timing mechanism—frequently eliminates need for additional switching relays.

THIS BASIC PNEUMATIC TIMER UNIT FEATURED IN ALL THESE TIMERS



How It Works: *Simple operating principle is based on the interval required to transfer a small volume of filtered air from upper to lower chamber through a regulated orifice* (A). *Rotation of knurled knob* (B) *gives wide range of adjustment. Air returns through valve* (C) *for instantaneous reset.*



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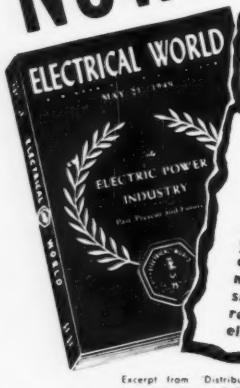
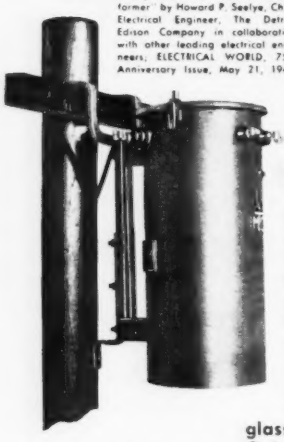


FUTURE POSSIBILITIES

. . It is to be expected that such activity (improvements) will continue in the future. Much of it can probably not be foreseen at this time. There are a few items, however, which might be mentioned as either distinct possibilities or highly desirable.

There is considerable promise of the production of a dry-type distribution transformer for pole top installation. The advantage will be less weight and lower maintenance. It seems possible that on such a transformer the case might be reduced to a minimum or perhaps be eliminated entirely.

Excerpt from "Distribution Transformer" by Howard P. Seelye, Chief Electrical Engineer, The Detroit Edison Company in collaboration with other leading electrical engineers, ELECTRICAL WORLD, 75th Anniversary Issue, May 21, 1949



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DRY TYPE AIR COOLED DISTRIBUTION TRANSFORMERS

Months before the publication of this excellent article on distribution transformers, Marcus, a pioneer in the field, announced a new line of *all purpose* dry type distribution transformers for indoor or outdoor service.

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permission" parts of the code could be eliminated to make it a more legally enforceable document, were in the hands of special committees.

All of the former recommendations for code changes not accepted by the NFPA Correlating Committee, Smith promised, would be referred back to the Article panels for further study. It was urged that the reasoning back of a proposed change be given along with the wording so that the merits of the proposal could better be appreciated and evaluated.

Official action was taken on the following: A recommendation from the Northern California Chapter that a section correlating committee be set up to give inspectors interpretations on the code to promote uniformity, was voted. A change in membership was voted which would permit city memberships as a means of aiding the financing of the association. A resolution by the Central California chapter asking for end-of-the-week instead of fore-part-of-the-week dates for the annual meetings to permit inspectors and contractors to participate was voted. The next meeting place selected was San Jose.

Officers elected were: R. B. Maxwell, San Jose chief inspector, president; E. V. Muller, Department of Industrial Safety, Los Angeles, first vice-president; R. D. Johansen, city electrician, Alameda, second vice-president; H. G. Ufer, Underwriters' Laboratories Inc., Los Angeles, secretary-treasurer; Executive committee members, Jesse K. Ross, San Bernardino city electrician; H. C. Moore, Modesto city inspector; C. C. McClelland, Division of Industrial Safety, San Francisco; H. K. Winterer, General Electric Co.

High praise was accorded the local committee for smooth running program and ample facilities and entertainment. Arthur Vesco, its chairman, was assisted by P. N. Jenson of his department; A. I. Benedict and E. E. Kipp of the utility; P. Montgomery, NECA manager; M. L. Radcliff, IBEW Local 569 manager; Robert Mellis, Southern Electric Co.; Harry Shopp, county inspector; A. E. Johnstone, California Electric Works; J. S. Bullied, Capital Electric Co.; W. B. Smith, city inspector, and Harold Cole, former inspector. Ladies entertainment was headed by Mrs. Vesco.

Entertainment at the banquet was home talent and surprised all by its versatility. Leon Guiberra, U. S. Rubber Co., was a colorful Spanish master of ceremonies. Joe Siddall performed feats of magic. A trio sang *An Inspector's Life Is Not a Happy One*, and the climax was a bull fight in which Tony Goulart, Santa Clara county inspector, starred as the bull.

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THE MONTH IN BRIEF

FPC Puts Wheeling Clause in License

In an unprecedented order issued last month, FPC requires Idaho Power Co. to carry federal power on transmission lines from its Bliss hydro plant, as a special condition to license for the plant and the two 138-kv. lines. Under terms of the order, federal power would be transmitted over the lines only to preference customers and only in amounts that will not "unreasonably interfere" with the company's use of the lines. This special condition was requested by the Secretary of the Interior. Idaho Power earlier refused to grant an Interior Department request for use of the Bliss Boise-American Falls Line, now under construction (EWEST, September, p. 114). Since the line runs in part across public lands under Interior jurisdiction, the department filed injunction suit against the company. A temporary restraining order by the U. S. District Court in Boise halted work on the line last August. But on Sept. 30 the court refused to grant an injunction and dismissed charges of trespass against the company, since it was building under FPC prelicense consent.

Protest Engineers' Report Economies

Every ten years Los Angeles Department of Water and Power is required by charter to be surveyed by an outside engineering firm. Last time the survey was used by a reform mayor to purge the department of political opponents and the Business Agent's Division was slashed to a skeleton. The new survey by Ford, Bacon & Davis also recommends cutting $1,200,000 from the budget of that division on the premise that industrial sales promotion is not necessary because there is "little industrial property available in Los Angeles" (a heresy to that city's chamber of commerce) and that range and water heater promotion is not warranted because further load increases must come from fuel-generated electrical energy and besides, "that natural gas has a strong economic appeal," hence range saturation is low. (More details of the report and the answers to it next month.) The present board of commissioners is giving the management a chance to present its answers and to work out what it considers reasonable economies before taking action. Support of the Southern California Radio & Electrical Appliance Assn. is also in jeopardy.

PUDs Make Power Rate Proposal

Should Washington state PUDs be successful in acquiring Puget Power generating plants, they would be willing to supply power to the cities of Seattle and Tacoma under a firm contract on a five-year basis at the then existing Puget system load factor. This was the tentative offer made last month by the PUD negotiating committee to officials of the two cities.

Seattle Says It Is Out of Running

City of Seattle announced a decision to withdraw entirely from competition for properties of Puget Sound Power & Light Co. Mayor William F. Devin stated that it was apparent that the PUDs are reluctant to surrender title to any generating facilities and the city is unwilling to assume additional distribution facilities without first being assured of adequate generation.

Power Act Challenged

Meanwhile constitutionality of the power act under which the PUDs seek to buy Puget Power properties is challenged in a suit filed in Thurston County Superior Court at Olympia. The law, passed by the 1949 legislature, permits two or more PUDs to join in purchase of privately owned power systems. Olympia firms and individuals bringing the suit seek to prevent Thurston County PUD from joining seven other districts in the purchase.

Interruptible Power Cut

In face of near low record river flow, interruptible power to two Northwest aluminum plants was cut off by Bonneville late last month. Aluminum Co. of America at Vancouver was cut 42,200 kw. and Permanente Metals Corp. at Spokane, 27,800 kw. Aluminum production at the two plants will be reduced about 25%; aluminum cable production at Permanente will not be affected. Bonneville Administrator Paul J. Raver earlier in the month had predicted a power curtailment program of greater scope than last year, unless rains brought river flow to average or better. With an expected increase in peak loads of about 300,000 kw., increased peaking capacity should make it possible to maintain frequency at 60 cycles, he said. (360,000 kw. has been added at Grand Coulee; 50,000 kw. at PP&L's Merwin Dam; 29,000 kw. by City of Eugene.) Grand Coulee 230-kv. lines were being forced to carry as high as 220,000 kw. per line, Raver's statement said. Next day, on Oct. 6, lightning knocked out a Bonneville-Vancouver 230-kv. line carrying almost 300,000 kw. Practically all transmission west of the Cascade Mts. from Vancouver, B. C. to below Eugene was affected.

Commission Bans Large-Scale Extensions

As a power conservation measure, Washington State Public Service Commission has ordered private power companies to refuse requests for new or additional industrial loads in excess of 500 kw., and for new or additional power for space heating. Only exceptions are installations "essential to public health, public safety or national security," or to meet contract commitments. Municipal utilities and PUDS, although not subject to commission ruling, are expected to adopt the regulation. Private companies also are directed to submit to the commission by Nov. 15 a program for further conservation of electricity to meet expected shortages next winter.

Tax on PUD Customers Proposed

When the City of Chehalis, Wash., found itself $17,000 short on financing its 1950 budget, the city commission proposed a tax on PUD customers in the city. The plan met immediate opposition from Carl Miller, PUD manager, who declared the district could not absorb the tax within its present rate structure. Furthermore, he said, operation costs have nearly doubled in recent months and the PUD has a revenue problem of its own.

KEARNEY TRIPOMATIC HEAVY DUTY FUSE CUTOUT

For High Interrupting Capacity on To-day's Power Lines

IN THE DAYS when heavily overloaded circuits were still the exception and not the rule, the Kearney Heavy Duty Trip-O-Matic non-indicating cutout was designed to meet the requirements of a large power company whose over-taxed circuits demanded heavy-duty protection. This cutout has served the company dependably with maximum protection for over nine years.

And now when overloaded circuits are an everyday problem and with the outlook for more and more power demands in the future, the Kearney HD cutout is available for all power companies. Its nine-year in-service record of electrical and mechanical dependability in protecting heavily loaded circuits subject to high short-circuit surges is your assurance of dependable performance.

Illustration shows the Kearney Trip-O-Matic Heavy Duty Fuse Cutout, Catalog No. 12143-10, 50 amperes, 5000 volts. Interrupting current rating — 5000 amperes at 5000 volts; 8000 amperes at 2500 volts.

For additional information on Kearney HD cutouts, write for Catalog Sheet 2-11.

FEATURES:

1. **Reinforced housing of highest quality wet-process glazed porcelain and the non-warping door of molded bakelite provide a heat and shock-resisting unit.**
2. **Silver-plated upper contact serves as a latch to hold the door in the closed position. The resilient corrosion resistant spring absorbs the impacts of high interrupting duty.**
3. **Stirrup latch on the non-indicating cutout prevents opening of door and insures against damage from cable expulsion or drawn-out arcs on extreme short-circuits.**
4. **Cartridge head with silver-plated contact studs assures excellent conductivity through four point pressure contacts with upper spring.**

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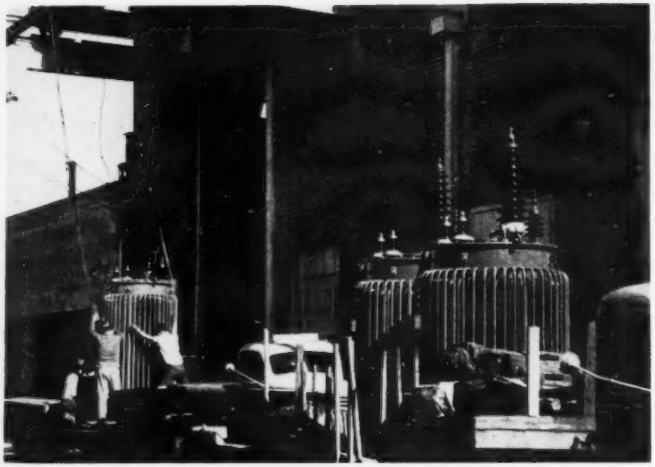

A battery of three 667 KVA Gardner transformers built for two primary voltages, 60,000Y or 22,860Y, down to 2400 volt secondary. Shown above as they were loaded for delivery to the East Bay Municipal Utility District.

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APRIL, 1950 issue of Electrical West in supplement form, will list again Directories of Manufacturers, Western Offices and Sales Representatives, Where-to-Buy-in-the-West and Appliance Service and Repair Parts.

See page 42 for New Product information. To secure manufacturers' literature, fill out and return the coupon on page 56.

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THIS MONTH'S NEWS

Fishing Groups Tell Plan For Power Development

Fisheries authorities of Oregon, Washington, and Idaho have placed before the Columbia Basin Interagency committee their program for the orderly development of power in the Pacific Northwest. At the October meeting of the committee at Astoria, Ore., the following program was outlined by Alvin Anderson, Washington state fisheries director:

1. Complete all dam projects now under way before starting new ones.
2. Complete Chief Joseph Dam on the Columbia and all dams above it before building any lower river dams.
3. Complete Hells Canyon Dam on the upper Snake River at an early date.
4. Postpone construction of the proposed four dams on the lower Snake River and Priest Rapids, John Day and the Dalles dams on the lower Columbia, until there is proof they are needed.
5. Keep the lower river fisheries rehabilitation program on its schedule calling for $20 million in ten years.

Spokesmen for the fisheries charged that river development programs of the past, planned without regard to fish preservation, have destroyed more than 75% of Columbia River spawning grounds, and they warned that if all proposed dam projects are built, less than 10% of the spawning areas would remain.

Arnie Suomela, master fish warden of Oregon, warned that salmon runs above McNary Dam must be preserved if "the greatest fish producing stream on earth" is to continue supplying salmon abundantly.

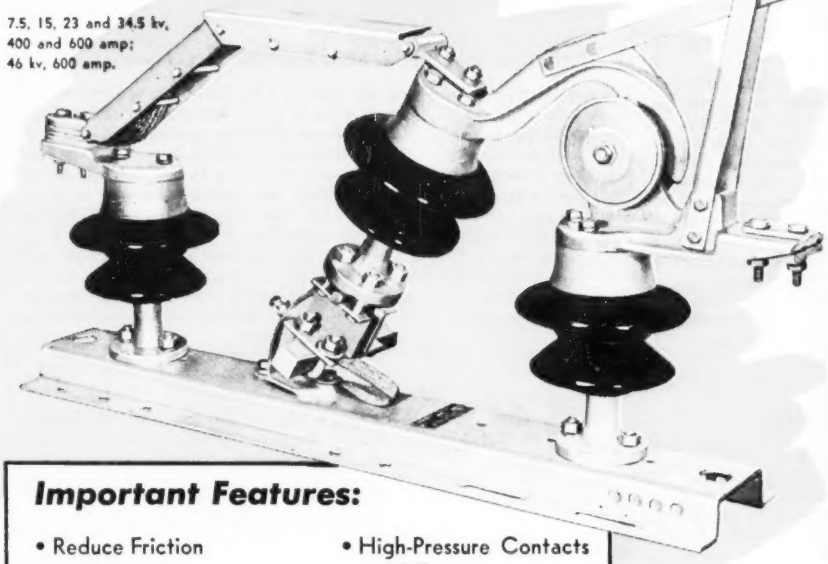
Col. William Whipple, Walla Walla district army engineer, explained that an elaborate fishways project is planned for Ice Harbor Dam and three other proposed dams on the lower Snake River.

"We concur with the fisheries people that salmon spawning grounds above McNary Dam should be preserved, and the federal government has put a big stake into that assumption," Colonel Whipple said. He cited Bonneville fishways as evidence that fish can migrate past dams. He added that adequate facilities for passage of fish through McNary Dam was assured when Congress appropriated $14 million for two fishways at the site.

Now..Rolling-Contacts on Rocking-Insulator Switches

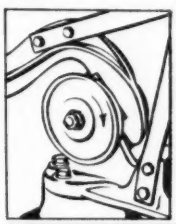
Type SW and SWA Outdoor Air Switches

7.5, 15, 23 and 34.5 kv, 400 and 600 amp; 46 kv, 600 amp.



OPENING

Twin discs move upward and revolve when switch opens.



CLOSING

Twin discs revolve when switch closes. Note goose-neck blade that makes lengthwise wipe contact and vertical entry.

ILLUSTRATED ABOVE:

Type SW, 15 kv, 600 amp. Type SWA is similar, two insulators per pole.

Important Features:

- Reduce Friction
- "Run" Cooler
- Assure Easier Operation
- No Contact Shunts
- Solid-Silver to Solid-Silver Inserts
- High-Pressure Contacts —80 lbs.
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UTILITY ASKS FIRST RATE JUMP IN YEARS

Pacific Gas and Electric has applied to the California Public Utilities Commission for a system-wide increase in electric rates. If granted, the increase will be the first for the company in 29 years.

The utility asked a total boost of $8,900,000 in rates, to bring the rate of return on its electric properties to an estimated 5% for 1950. The return in 1948 was 4.29% and the 1949 percentage is expected to be about 4.41%.

The application asks an increase of 6% on monthly bills computed at present rates, about 1 cent a day on the average household bill.

The company said that operating expenses have increased during recent years to a point seriously out of line with rates, which have been reduced frequently since 1923, the last time in 1946.

It pointed out that it is imperative that earnings be increased to provide an adequate return on its investment in physical properties and continue to attract the large amounts of new capital necessary for carrying out its post-war construction program—a program that will have cost some $500,000,000 by the end of this year.

The California PUC recently granted PG and E permission to increase its gas rates, stipulating, however, that rates be figured on an "escalator" basis to vary with fluctuating oil prices.

This special grinding machine was designed by Seattle City Light to remove 1 to 1½ in. of aggregate from a tunnel bringing water from the Skagit to Gorge power house. Installing a 60,000-kw. generator at the plant, City Light dewatered the 20½-ft. diameter, 11,000-ft.-long tunnel to prepare it for a two-thirds increase in water. Unwilling to reduce water-carrying capacity by guniting the tunnel floor, the company decided to grind down the aggregate. Told it couldn't be done, City Light designed its own machines, built the first one. Willamette Iron & Steel of Portland built three more for the Guy F. Atkinson Co., contractor. Construction cost amounted to about $18,000 for the four machines, which did the job in 45 days. Grinding added about 10 ft. of head, resulted in considerable monetary saving, according to C. W. Cutler, Skagit project superintendent

San Diego Company Drops Rate Increase Request

San Diego Gas & Electric Co. stated it would drop its attempt to secure electric and steam rate increases, substituting a request for higher rates for both household and commercial gas users. H. G. Dillon, vice-president of the company, explained that recent decreases in the price of fuel oil on the West Coast made it possible to discard the earlier plan.

● Idaho Power Co. has asked FPC authorization to issue up to $12,000,000 in first mortgage bonds. Proceeds will go into construction and improvement of operating facilities.

● Lower Valley Power & Light Inc. of Freedom, Wyo., has asked FPC to license a proposed hydroelectric plant on Strawberry Creek in Lincoln County. The cooperative would build a low concrete dam near Bedford, Wyo; a two-mile steel pipeline; power house with initial installation of two 725-hp. turbines connected to two 500-kw. generators, with provision for a third unit; substation, and a 12.5-kv. transmission line connecting with the co-op system.

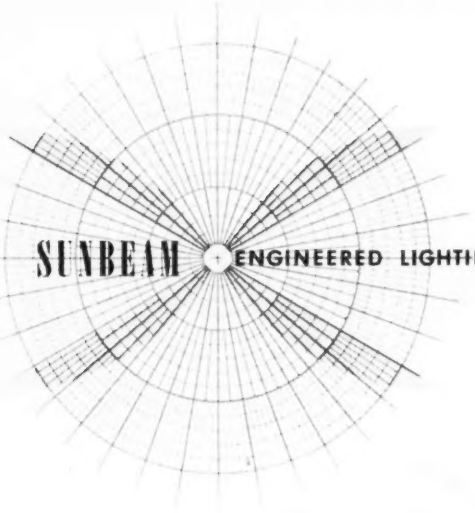
Commission Allows Sale To California Electric

The California Public Utilities Commission has authorized the San Gorgonio Electric Corp. to sell its property to the California Electric Power Co. The San Gorgonio Corp. owns property in San Bernardino and Riverside counties, including hydroelectric plants and canals. Under terms of the sale the company will get 17,640 shares of California Electric common stock valued at $127,701.

● FPC has issued an initial decision finding Arizona Edison and Central Arizona Light & Power companies subject to its jurisdiction. The decision, by Examiner M. G. Baron, is subject to review by the commission, on appeal of the companies within 20 days or FPC motion within 10 days. Neither company responded to the "show cause" orders instituting the proceedings, or attended the June 6, 1949 hearing.

● A Residential electric rate reduction for Coolidge, Ariz., customers of Arizona Edison Co. will amount to nearly 40% in certain categories. New rates are 5.25c per kwh. for the first 30 kwh.; 3.5c for the next 40 kwh.; 2.5c for the next 200 and 1.25c for all over 400 kwh. The new schedules were made possible by negotiations with the U.S. Indian Service, which sells power to the company in the Coolidge area.

● The 1950 Budget of Clark County PUD of Vancouver, Wash., includes $764,000 for plant improvements. Gross revenues are estimated at $2,594,000.



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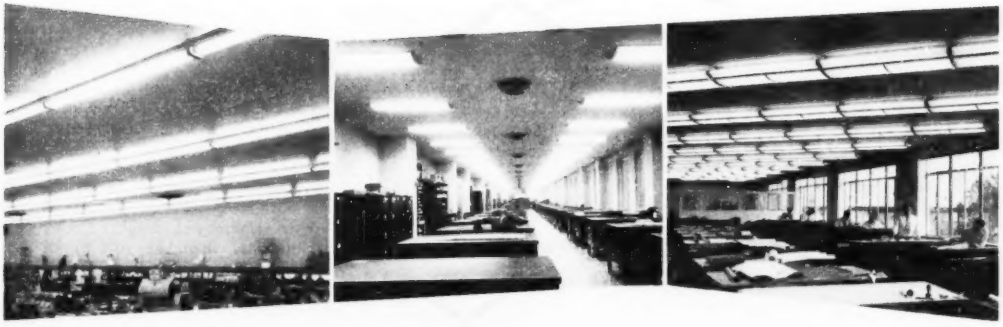

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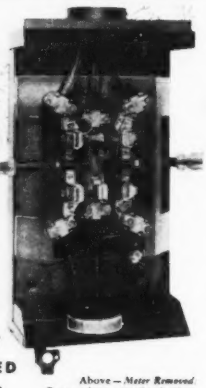

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LAFAYETTE INDIANA

CALAPCO BEGINS SERVICE ON NEWLY ACQUIRED LINES

Northern Arizona Light & Power Co., newly formed subsidiary of Central Arizona Light & Power, is serving electricity over the lines formerly owned and operated by Arizona Power Co. The agreement, concluded Oct. 25, is the result of negotiations started several months ago. (EWEST, July, p. 116).

According to Henry B. Sargent, Calapco president, the company will be able to help solve the power and service problems of northern Arizona. Expansion of Calapco's own generating plant will make it possible to improve northern Arizona's power supply almost immediately, he said. Both companies are under local control and management, he pointed out.

William P. Reilly of Prescott, former Tapco president, is vice-president and general manager of the new company. Other officers are Malcolm M. Bridgwater and Lauren V. Seares. General offices will be in Prescott.

Public Ownership Defeated By Two to One Majority

Municipal ownership was defeated by a two-to-one majority at Montrose, Utah. The proposal was to adopt a charter amendment calling for revenue bonds up to $675,000 for acquisition of a municipal electric light and power system.

An intensive campaign against the measure was carried on by Western Colorado Power Co. employees and a committee of local citizens. The campaign included direct-mail and handout pieces, newspaper and radio advertising and window display.

The argument pointed to the disadvantage to Montrose of losing the power company's large pay roll, local expenditures and taxes. It was brought out that a $675,000 bond indebtedness, with interest over a period of 20 years, would grow to more than a million dollars. Rates in Montrose, lower than those of the neighboring municipal system at Delta, were another talking point.

● INCREASES in wages of city electrical workers at Seattle, Wash., have been asked by Local 77, International Brotherhood of Electrical Workers, in a petition filed with the city council. Helpers would be increased 12c a day to $12.98 and material men 16c to $13.68. The petition also asks that power station operators for City Light be placed on a wage parity with employees of other utilities in the Pacific Northwest doing similar work.

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WORK GOING FORWARD ON CALIFORNIA OREGON PLANTS

Two units of the California Oregon Power Co.'s Toketee Falls hydro project on the North Umpqua River in western Oregon have been completed, and a third unit is expected to be in operation before the end of the year. The three units, part of a $30,000,000 construction program, will provide 40,500 kw. of additional energy.

Plans have been approved and field work has been started on two other plants downstream from Toketee Falls. One, at Slide Creek, will produce 18,000 kw. and the other, at Soda Springs, will give an additional 11,250 kw. The Slide plant is scheduled for completion in late 1950 and the Soda Springs plant by April 1951.

Ultimately the company plans to have eight plants in the North Umpqua.

Construction on John Hart Development to be Dropped

Further construction on the John Hart Hydro development of the British Columbia Power Commission at Campbell River, B. C., will be suspended when the second phase of the $14,000,000 project is completed in late October. S. R. Weston, chairman of the commission, stated that the second phase, now finished, brings the capacity of the project up to 112,000 hp. Ultimately the Campbell River development can produce an additional 50,000 hp., but this unit will not be built at the present time.

A ceremony on Oct. 21 launched the operation of two more 28,000-hp. generating units brought into play by construction of a dam at Ladore Falls just below the outlet of Campbell Lake.

The first two 28,000-hp. units began operations at the beginning of 1948. Since then the commission has gradually enlarged its distribution system and now serves more than 19,000 Island customers in addition to several big industrial users.

Transfer of Lines Ends Duplication Controversy

A transfer of lines ending service duplication has ended a year-long controversy over distribution between the Verde Electric Cooperative and the Arizona Power Co. in northern Arizona. The power company previously had obtained an injunction preventing the co-op from building additional facilities. Under terms of the agreement, the power company will request the injunction be lifted, and will furnish the co-op with power at three points, enabling the latter to discontinue Diesel generation.

Engineers Call Bids on McNary Dam Turbines

A call for bids has been issued by the Corps of Engineers for four additional 111,300-hp. hydraulic turbines for the power house at McNary Dam, now under construction on the Columbia River. Opening of the bids is scheduled for Dec. 6 at the office of Col. William Whipple, district engineer, Walla Walla, Wash.

Delivery of the first unit is scheduled for May 1, 1954; second unit Sept. 1, 1954; third unit Jan. 1, 1955; fourth unit, May 1, 1955. Under a contract awarded to S. Morgan Smith Co., York, Pa., in June, 1948, turbines for the first four McNary power units are scheduled for delivery in 1953 and 1954.

Notices to proceed have been sent to the contracting companies involving other work in connection with the McNary Dam power house. One of the notices went to Moloney Electric Co., St. Louis, Mo., contractor for the manufacture of seven 56,500-kva. single-phase, 3-winding power transformers. The contract price was $857,800. The second notice went to Machinery Manufacturing Co., Minneapolis, Minn., contractor for the manufacture of two 3,750-kva. alternating-current generators for the McNary station service units, on a bid of $155,132.

Fourth Redondo Beach Generator on Line

Southern California Edison Co. put the fourth generator into operation in mid-October at its $38,800,000 Redondo Beach steam-electric generating plant. The fourth unit, similar to three others installed since March 1948, has an effective operating capacity of 70,000 kw., and brings the plant's total power output to 280,000 kw. The plant was started more than three years ago and was built by Stone & Webster Engineering Corp.

● The Gorge power plant of Seattle City Light, closed since May 1 for construction work, has resumed power generation, producing 60,000-kw. The plant was shut down to permit repairs to the 11,000-ft. power tunnel and prepare for future installation of a 65,000-kw. generator. The new generator will be in service next September.

MERWIN DAM ADDITION NEARING COMPLETION

Generating equipment at Pacific Power & Light Co.'s Merwin Dam in southwest Washington is expected to go into operation not later than Dec. 1. Installation of a 45,000-kw. generator was 70% complete on Oct. 1, although delayed by difficulties in delivering the 55-ton shaft.

Work at the Portland, Ore., end of the line, where the Albina substation will receive power from the dam, also is nearing completion. The project is a part of a $3,800,000 improvement program.

Irrigation District Will Add Facilities

The Imperial (Calif.) Irrigation District has awarded two contracts totaling more than $1,000,000 for construction of additional power facilities on the All-American Canal.

A $772,818 contract awarded to Allis-Chalmers Mfg. Co. was for furnishing a 30,000-kw steam turbine-generator unit and accessories for Unit No. 2 of the El Centro steam station. A $237,875 contract went to the H. C. Smith Co., Los Angeles, which will install the 30,000-kw unit and a 10,000-kw turbine-generator and construct a switching station for the district's No. 4 hydroelectric plant located on the canal near Calexico.

B. C. Power Commission Buys Electric Properties

Properties of the Lake Cowichan Electric Co. have been purchased by the B. C. Power Commission and been incorporated in the company's Vancouver Island system.

Purchase was authorized by the government at a figure of $68,000. It adds 428 customers to the 19,000 served by the commission on the island.

For the present the commission will continue to buy power from the Hillcrest Lumber Co. to serve the area, but will start building a power line to Duncan to hook into the power supply from the Hart hydro plant at Campbell River.

● THURSTON COUNTY PUD of Olympia, Wash., will make a purchase offer for Puget Sound Power & Light Co. properties in the county, it was announced last month. Value of the properties has been set at approximately $5,000,000, according to N. Y. Haskett, PUD secretary.

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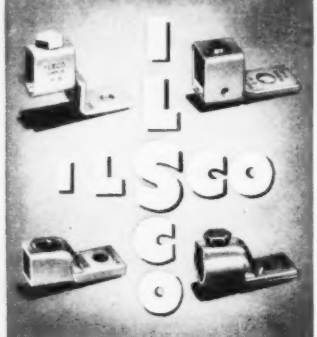

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NEWS ABOUT PEOPLE

● CARROLL V. ROSEBERRY has been transferred to Los Angeles as supervisor of the Westinghouse central station division. He succeeds RALPH A. HOPKINS, who is retiring after more than 42 years with the company. For the past two years, Roseberry has been assistant district central station division manager, with headquarters at San Francisco.

● LESLIE W. NIMS has retired as personnel director of Utah Power & Light Co., after serving with the utility for 42 years in Utah and Idaho. Beginning service as a power plant operator, Nims held positions as division superintendent, traveling maintenance engineer, system power dispatcher and division manager. He was named personnel director of the company in 1944.

● CHANGES in district managers of San Diego Gas & Electric Co. were occasioned after the death of Howard Glascow, at La Mesa. To fill that vacancy PAUL L. CORRIERE, Coronado district manager, was moved to La Mesa; LLOYD WALL from San Juan Capistrano to Coronado, and KEN BROWN, former merchandising salesman, to San Juan Capistrano as manager.

● O. G. HITTLE, who recently resigned as manager of the Lower Columbia district, Bonneville Power Administration, has accepted a position as manager of the Cowlitz Public Utilities District, operating in the Longview-Kelso area of southwestern Washington. He fills a vacancy caused by the resignation of C. T. Hurd, Kalama, Wash.

● E. G. RUSH, former manager of the Southeast Colorado Power Assn. at La Junta, Colo., has assumed management of the North Wasco PUD, which is distributing Bonneville power in competition with Pacific Power & Light Co. in the Dalles and surrounding area.

● GEORGE D. ATKINSON, electrical engineer at Shasta Dam, has been named superintendent of operations of Shasta Dam and power plant and of Keswick Dam and power plant. These major features of the Central Valley Project are located near Redding, Calif.

McDonald

● JACK L. MCDONALD has been appointed director of special services for Central Arizona Light & Power Co., Phoenix. He will direct the utility's youth program, and will conduct a speaker's bureau and plant tour section. Prior to accepting the Central Arizona position, McDonald was new business manager for Arizona Edison.

● THREE MEN well known to the electrical industry in the West will receive 50-year gold certificates from the National Electrical Manufacturers Assn. at its annual meeting in Atlantic City this month. They are CLAUDE L. MATTHEWS, president and one of the founders of the W. N. Matthews Corp., St. Louis, Mo.; CHARLES E. WILSON, president of General Electric Co., New York City, and FAY WOODMANSEE, president of Electrical Engineers Equipment Co., Melrose Park, Ill.

● LLOYD C. SHACKELFORD has been appointed a wire and cable specialist for the construction and materials department of General Electric Co., with headquarters in Seattle. He has been with G-E since 1941.

● ON AUGUST 1 E. H. Fohrman became operating manager for Graybar in the San Francisco district. He has been with the company for 14 years, most recently serving as district operating manager at St. Louis.

● R. E. WILLIAMS has been appointed assistant to O. L. Pringle, vice-president in charge of sales for Columbia Steel Co. R. O. Hails will succeed Williams as director of production planning.

● LORIN A. MOORE has been appointed district engineer of the Bonneville Power Administration at Eugene, Ore. He was formerly an engineer for Bonneville Power in Portland and Eugene.

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● J. N. JONES of Redwood City, Calif., has been named electrical superintendent for the Pacific Coast district of Westinghouse. He joined Westinghouse in 1936 at East Pittsburgh as an engineer in the central engineering department. In 1942 he was transferred to the company's Los Angeles office as a consulting and application engineer. He was appointed electrical service supervisor there in 1946 and served in that capacity until his recent transfer to the San Francisco office.

● E. B. BARNES has been appointed Pacific Coast regional manager of the Kelvinator division of Nash-Kelvinator Corp., succeeding the late C. J. Bachman. He joined Kelvinator in 1936 and four years later moved to Los Angeles as branch manager. He has been zone manager there since 1945. At the same time JOHN DOWNING was appointed Los Angeles zone manager. Downing joined Kelvinator as a district manager in Los Angeles in 1940 and seven years later was appointed sales manager of the zone.

● J. T. ERICKSEN has been named Western district manager for the housewares and stove division of the National Enameling and Stamping Co., succeeding GEORGE M. DOUMA, who was recently appointed assistant sales manager of NESCO's electrical division in Milwaukee. Ericksen has been sales representative for the firm's housewares and stove divisions in the Los Angeles area for the past four years. J. E. ENGLAND, who has been sales representative in the San Francisco area, will take over the Los Angeles area. Ericksen will make his headquarters in the Western Merchandise Mart, San Francisco.

● J. R. KELLY has been named acting manager of General Electric Co.'s design division at Richland, Wash. He replaces F. W. WILSON, who resigned. He came to Hanford Works in 1948 as administrative assistant in the design and construction division.

● B. G. SANDERSON, formerly Western regional sales manager of the Deep-freeze Division of Motor Products Corp., and more recently manager of field sales for the company, has been appointed manager of refrigerator sales, reporting to general sales manager George F. Weisenbach.

● CLIFFORD KNAPP, formerly Emerson Radio & Television representative for the Pacific Northwest, has been transferred to Los Angeles in charge of southern California. He will work with DAVID HOPKINS, Western divisional sales manager for Emerson.

● C. H. HOPER, former city manager of Colorado Springs, has joined the firm of R. W. Beck and Associates, public utility analysts and engineers. In making the announcement, Beck said that he expected to open an office in Colorado Springs early next year. Hoper has been associated formerly with the Public Service Co. of Colorado and the USBR.

Deaths

● JAMES R. KEARNEY Sr., founder of the James R. Kearney Corp. and well known in the West, died Oct. 4 in St. Louis. Mr. Kearney was president of the corporation for 14 years and at the time of his death was chairman of the board. He began work in power plants at 17, later was salesman, inventor and engineer. He started his firm with six men in 1926; in the early 30s he expanded his plant and added employees, instead of retrenching during the depression years.

● RAYMOND M. ALVORD, commercial vice-president of General Electric Co.'s Pacific district from 1938 until his retirement in 1947, died Oct. 24 in San Francisco. A native of Illinois, he moved to San Francisco in 1906, as sales engineer with G-E. He was active in civic affairs; was past president of the PCEA and of the San Francisco Electric Club.

● BEN M. TASSIE, Pacific district manager of the General Electric Co. appliance and merchandise department, died Oct. 31 at his home in San Francisco. Before joining G-E in 1941, Mr. Tassie was with Manning Bowman Co., first on the Pacific Coast, later at Meriden, Conn. He was company president when he resigned to join G-E.

● FRED W. HOLZ Jr., well known to utility people throughout the West as the associate of Ashton B. Collins, Reddy Kilowatt Service, died suddenly of a heart attack last month in New York. His last visit West was during the meeting of the Business Development Section, Northwest Electric Light & Power Assn. at Salt Lake City in May.

● HOWARD GLASGOW, district manager for San Diego Gas & Electric Co. at La Mesa, died early in October. He had served since 1938 at La Mesa as district manager; before that from 1929 was branch manager at National City.

● WALLACE C. RYAN, who was for 25 years in the electrical contracting business in Vancouver, B. C., and who moved to California 12 years ago, died recently in Alhambra, Calif.

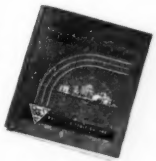
R&S HEAVY DUTY RECEPTACLES AND PLUGS

Many unique built-in features insure adequate *safety factors*, assure *low maintenance*, and allow *ease of installation*.

The high degree of standardization and interchangeability of parts provide a wide variety of types and sizes to meet every requirement.

Ratings from 30 to 400 amps., 250 and 600 volts.

VAPORTIGHT WATERTIGHT AND EXPLOSION-PROOF



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Sold Through Electrical Wholesalers
SALES OFFICES IN PRINCIPAL CITIES

SINCE 1902
RUSSELL & STOLL COMPANY, INC.
Precision-Built Electrical Equipment
125 BARCLAY STREET, NEW YORK 7, N. Y.

Feature Devices from the KULKA Line

BAKELITE WEATHER PROOF SOCKET

No. 202A. Medium Base. Has shadeholder ledge. Made of Bakelite and designed especially for outdoor use. Has molded Bakelite insert to prevent shorts from water leaks. Center contact is of phosphor bronze. Comes with wire leads.

No. 203 RUBBER WEATHER PROOF SOCKET. Designed for heavy duty. Shell is of special molded rubber, and insert is of Bakelite. 100% weather proof.

PIN TYPE WEATHER PROOF SOCKET

Has unique attach-on feature. Quickly wired and installed, as it requires no soldering. Has suspension hook. Rugged construction makes it ideal for all outdoor decorative lighting.

Write for Information or Catalog.

KULKA ELECTRIC MFG. CO.
30 SOUTH ST., MT. VERNON, N. Y.

NOTES ON THE TRADE

● PRODUCTION capacity of General Electric's transformer manufacturing plant in Oakland, Calif., has been more than doubled with completion of a $2 million expansion and modernization program. Output of the plant, which will serve the West Coast primarily, will be about $8 million annually, with total employment of about 500.

● PACKARD-BELL CO., Los Angeles, is building a new $250,000 building on Olympic Blvd., which officials state will be completed around Jan. 1. At that time the firm will vacate its present Wilshire district quarters. The new building will provide more than 54,000 sq. ft. of office and production space and will house sales, executive, assembly line tooling and dyeing facilities.

● B. H. "Barney" CLAWSON has become branch manager of Thor Corp. in northern California, replacing DON B. LENNARD, who retired recently. Clawson has acted as sales manager of the branch for more than four years. Prior to that time he was associated with Breuners in Oakland and with George Belsey Co., Los Angeles appliance distributor.

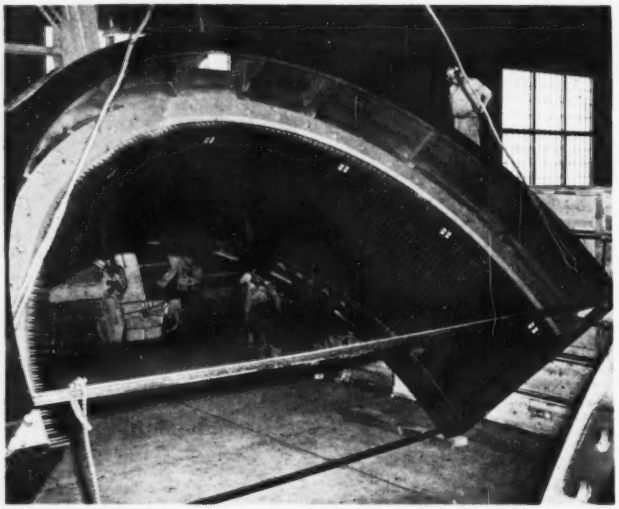
● LLOYD SUTTON, Western Merchandise Mart, San Francisco, recently named West Coast district manager for Whiting Corp., has appointed Kaemper-Barrett Dealer Supply of San Francisco as exclusive Whiting distributor for northern California, and Kerwin, Shane & Young of Los Angeles as exclusive distributor of Whiting freezers in southern California.

● STEPHEN M. BATORI, Seattle consulting engineer, has formed the Stephen Batori & Co., engineers and consultants, with offices at 220 James St. in Seattle. He was formerly with the DeWitt C. Griffith & Associates firm of engineers.

● THOMAS L. MATNEY, former state electrical inspector of Washington, has set up an electrical, mechanical and consultants firm, Thomas L. Matney & Associates, at 201 Chambers Bldg., Olympia.

● GEORGE NEMLIN is now associated with Knapp-Monarch Co., 541 S. Spring St., Los Angeles.

● DARRELL R. PERON has joined Sues, Young & Brown Inc., 3636 S. Bronson Ave., Los Angeles.



This 88,000-lb. section of what will be the world's largest electric motor is lowered to the assembly building floor at Grand Coulee. The 65,000-hp. motor will be used to pump irrigation water. The motor, when assembled, will be 22 ft., 11 in. in diameter. It was built by Westinghouse at a cost of approximately $400,000. Similar large motors are being built by General Electric for installation at the Coulee pumping plant

● FEDERAL TELEVISION CORP., New York City, has appointed the Blackman Sales Co., Los Angeles, as exclusive factory representative for the eleven Western states.

● L. G. FISKE CO. recently made its fourth expansion by taking larger quarters at the Merchandise Mart Bldg. in Los Angeles.

● ELECTRICAL DISTRIBUTING CO. INC., Portland, and Radio, Television & Appliance Co. Inc., Seattle, have been appointed distributors of Whirlpool home laundry equipment made by Nineteen Hundred Corp.

● KELLY & CO., distributor of television accessories, has opened an office in the Western Merchandise Mart, San Francisco.

● KINNEY BROTHERS, Fresno, have been appointed distributor for Hoffman Radio Corp., Los Angeles, according to R. J. McNeely, director of sales for Hoffman.

● VANCOUVER LIGHTING SUPPLY has ceased operation of its retail branch in Vancouver, B. C., and will confine its activities to wholesale operations from Vancouver headquarters.

● VALLEY INDUSTRIAL SUPPLY CO. INC., Ontario, Calif., and Rogue River Hardware, Grants Pass, Ore., have been named West Coast dealers for Allis-Chalmers' general machinery division.

● FLINT DISTRIBUTING CO., Salt Lake City, has been named RCA-Victor distributor for Utah, Wyoming and Nevada.

● ALDRICH AND JOHNSON, consulting engineers, have opened offices at 4036 N. E. Sandy Blvd., Portland. The partners are KENNETH B. ALDRICH and WILLARD JOHNSON.

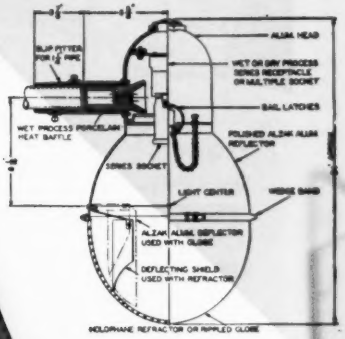
● ANSLEY RADIO & TELEVISION INC. has announced appointment of Blackman Sales Co. as its sales representative on the West Coast for all Ansley products. The firm recently opened a warehouse and service department at 141 S. Kings Road, Los Angeles.

● THOMPSON-DIGGS CO., Western Merchandise Mart, San Francisco, has taken on distribution of General Home Conditioner, a floor polisher made by General Floorcraft Inc., New York City.

● BILL LARSON has joined the sales staff of the Hoffman Sales Corp. located at the Western Merchandise Mart in San Francisco. He will cover the East Bay area. Larson formerly had his own television sales agency at the Mart.

JOSLYN

TYPE 95 LUMINAIRE


ALUM. HEAD
SLIP FITTER FOR 1½" PIPE
WET OR DRY PROCESS SERIES RECEPTACLE OR MULTIPLE SOCKET
BAIL LATCHES
WET PROCESS PORCELAIN HEAT BAFFLE
POLISHED ALZAK ALUM. REFLECTOR
SERIES SOCKET
LIGHT CENTER
HOOD BAND
ALZAK ALUM. DEFLECTOR USED WITH GLOBE
DEFLECTING SHIELD USED WITH REFRACTOR
HOLOPHANE REFRACTOR OR RIPPLED GLOBE

1. **Adjustable slip fitter for 1¼" pipe (with or without heat baffle).**

2. **Series receptacle and multiple socket mounting holes spaced 4½" to allow interchangeability.**

3. **Bail latching of reflector to hood providing interchangeability with respect to reflectors and reflector-glassware units of various types.**

4. **Aluminum wedge band glassware holder affords positive attachment of Holophane refractors or the new pressed globe which has diffusing ripples on inner surface and smooth easily cleaned outer surface.**

5. **Gasket free coupling of reflector to hood and reflector to glassware.**

6. **Available in various light distribution classifications recommended by I.E.S. for street and highway lighting.**

7. **Can be equipped with porcelain entrance bushings, external terminals or gland type bushings with rubber packing gland.**

THE TYPE 95 LUMINAIRES are also available with the new, unique, gasketless latching which permits relamping from the ground. *Write for further information.*

LOS ANGELES
SAN FRANCISCO
SEATTLE
PORTLAND

JOSLYN PACIFIC CO.

Complete Pole Line Equipment

5100 DISTRICT BLVD., LOS ANGELES 11, CALIF.

THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.

MAIN PLANT Newark 2, N. J.

JEFFRIES

TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY

1710 E. 57th St. Los Angeles 11, Calif.

All Sherman Lugs are individually inspected before shipment to maintain accurate dimensions and eliminate flaws affecting service qualities.

H. B. SHERMAN
Manufacturing Co.
Battle Creek, Mich.

Sherman
SOLDERING LUGS

● GEORGE R. DUNCAN has joined two old Schenectady test buddies, A. E. Smith and L. O. B. Lindstrom, in the firm that will now be known as Smith, Lindstrom and Duncan and at a new location, 16 Toland St, San Francisco. Duncan, a native of Montana, graduate of University of Minnesota, served six years with General Electric Co., 24 with Pacific Electric Motor Co., Oakland, in sales engineering and construction. The firm offers a broad industrial electric service, with emphasis on equipment, industrial control apparatus assembly and special engineering projects, particularly in the lumber industry. It is a dealer for industrial equipment of all types, manufacturer of special production equipment, contractor for installation, runs a motor service shop and carries industrial electrical supplies.

● DR. K. B. MCEACHRON, longtime lightning expert of the General Electric Co., visited electric utilities and made several public appearances in the West during October. He spoke on lightning and lightning protection before the Los Angeles section, AIEE, on Oct. 11, and San Francisco section, AIEE, Oct. 18.

DIRECTORY ADDITIONS

DIRECTORY OF MANUFACTURERS

GENERAL SWITCH CORP., Brooklyn, N. Y.—J. C. Richards Co., Los Angeles; Slaybaugh-Thompson Co., Denver.

O. Z. ELECTRICAL MFG. CO. INC., Brooklyn, N. Y.—R. H. Fisher Co., San Francisco.

WARD LEONARD ELECTRIC CO., Mt. Vernon, N. Y.—Central Station Engineering Co., Tucson, Ariz.

FEDERAL ELEC. PRODUCTS CO., Newark, N. J.—Shaffer & Nelson Inc., Portland and Seattle (for Idaho, Oregon, Washington); Gaer, Florance & Assoc., Denver (for Colorado, Wyoming, parts of Utah).

SOLAR ELEC. CORP., Warren, Penn.—Dirks & Co., Portland (for Washington, Oregon, Idaho).

DIRECTORY OF REPRESENTATIVES

DENVER: Gaer, Florance & Assoc., 2052 Humboldt St.

PORTLAND: Shaffer & Nelson, Inc., 411 Weatherly Bldg.; Dirks & Co.

SEATTLE: Shaffer & Nelson Inc., 312 Occidental Ave.

DENVER: Slaybough-Thompson Co., 100 W. 13th Ave.

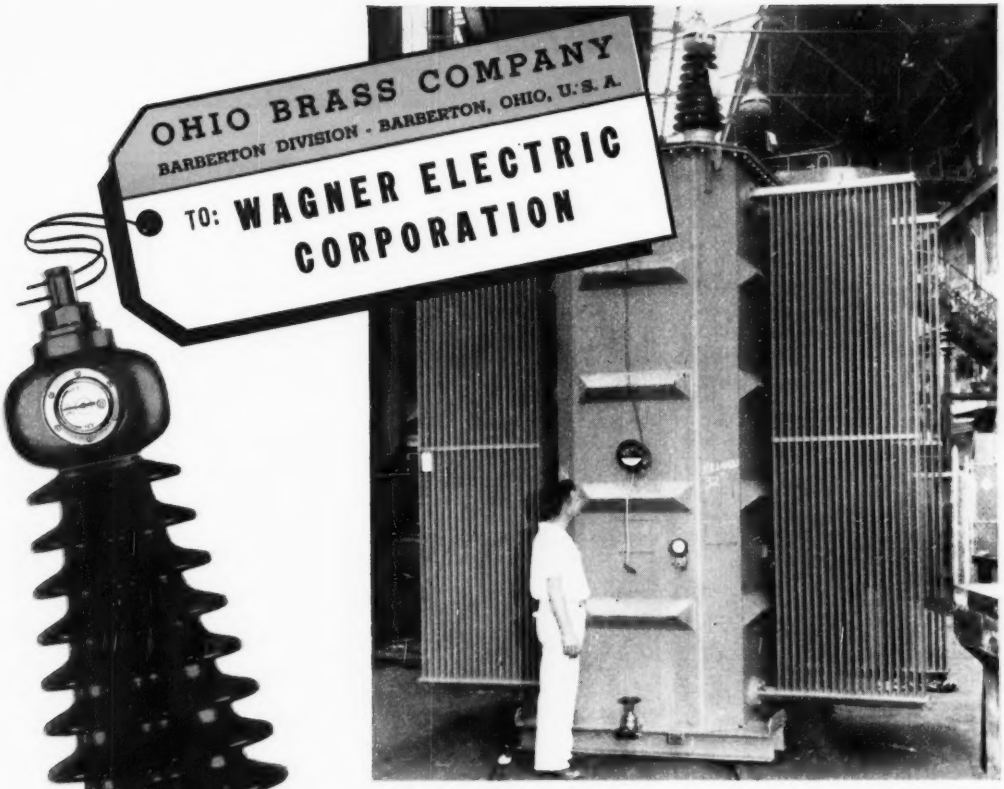
LOS ANGELES: Jesse C. Richards, 440 Seaton St.

PHOENIX: J. C. Coulson, P. O. Box 1360, 419 W. Jackson St.

SPOKANE: Keeler, White Co., 322 Radio Central Bldg.

CHANGE OF ADDRESS

Will M. Aronson Co., 666 Howard St., San Francisco 5.



ONE OF a bank of four Wagner transformers now going into service and, like many other Wagner units, equipped with O-B bushings as another step toward highest reliability. Size and general make-up of these transformers are indicated by a few specifications supplied by the Wagner Electric Corporation: "Each unit rated at 5,000 kva, single phase, 60 cycle, 39,850/69,000 Y to 12,000 volts. Oil filled, self cooled, and equipped with vertical inert gas oil seal tank for oil preservation. Among other refinements are magnetic oil level indicators with alarm contacts to warn of low oil level, dial type oil temperature thermometers with alarm contacts, combination pressure and vacuum gauges..."

AND (B) BUSHINGS

ONE OF THE FINEST COMPONENTS OF *ANY* TRANSFORMER

Ohio Brass

MANSFIELD, OHIO

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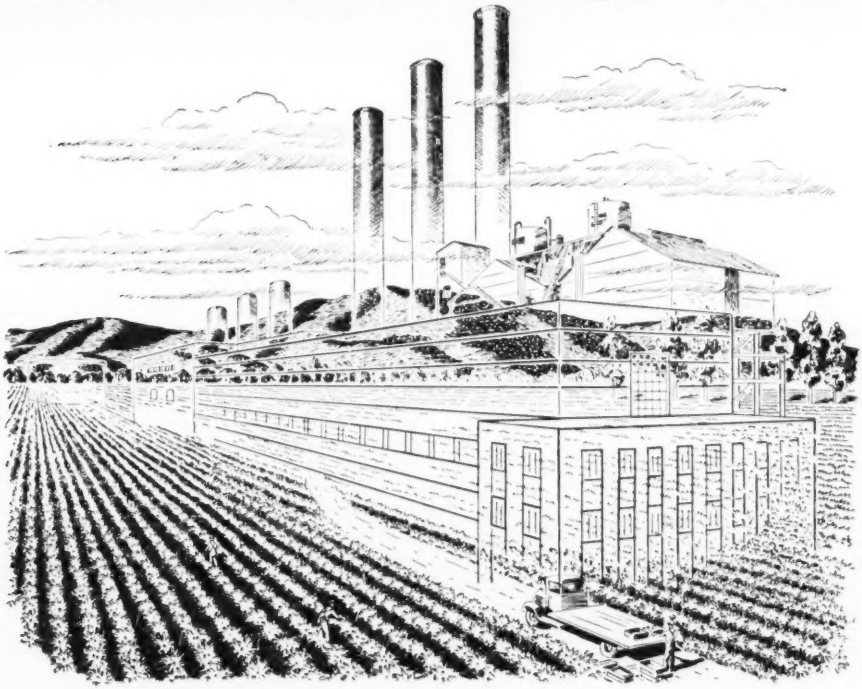
PROFILES

Walter J. Maytham Jr. (right) who comes to the Pacific Coast from Chicago, as district manager for Westinghouse Electric Corp. He succeeds retiring Vice-President Charles A. Dostal as head of sales activities in nine Western states. Headquarters are in S. F.

Pictured at Utah Power & Light Co.'s Orem steam plant are (left to right below): E. M. Naughton; J. A. Hale, vice-president in charge of engineering; T. A. Purton, chief engineer. A new 43,000-kw. unit is being added at the plant at a cost of $7,100,000

Far Western representatives at recent Allen-Bradley sales convention in Genoa City, Wis. (left to right): D. E. Johnson, Portland; W. E. Young and J. M. Humphrey Jr., Denver; W. S. George, San Francisco; L. Muth, Seattle; L. Hoffman, Albuquerque; H. D. Easterbrook, Los Angeles; C. E. Klaus, Portland; H. E. Campbell of San Francisco, and W. W. Kloster of Los Angeles, Calif.

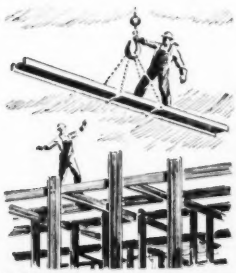
Artichoke land will soon grow power



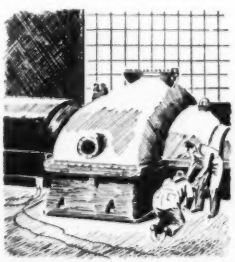
A 280-acre vegetable farm near Moss Landing on Monterey Bay soon will be producing the greatest crop of power in P. G. and E. history for Northern and Central California.

For here is being built the company's largest steam plant, a 402,000-horsepower giant whose electric output will contribute to P. G. and E.'s entire interconnected system.

This is the ninth major producing unit begun since V-J Day to serve the growing demand for power in California. Four already have been completed, and still others are planned.



1,500 workmen will be on this job when construction reaches its peak, and a good share of the $51,500,000 estimated cost of the project will be in payroll, which in turn will pass on to local business.



On the line in the spring of 1950 will go the first of three 134,000-horsepower generators; the others are scheduled for the following year. Preliminary work already is going full speed ahead.

for the record

The plant's huge boilers will be fired by oil shipped in by both sea and rail.

P. G. and E. already has invested $300,000,000 in postwar power facilities.

Half a million new horsepower are already at work for Northern and Central California.

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

EW-111-1149

Sports Floodlighting
— a profitable enterprise

Installation meets NEMA recommendations . . .

- Wiring for 240-1500 watt floods
- 1-steel taper tube poles—100 feet high
- Underground wiring
- Public address system

The athletic field floodlighting installation for the Alhambra Union High School at Martinez, California, is an example of how the enterprising cooperation of a utility lighting engineer, an electrical engineer and local electrical contractor can produce a profitable civic asset. Revenue from field rental for sports and other public events will pay for this "Class A" lighting installation in two to three years. There are hundreds of California communities who want recreational field lighting, according to a recent survey. Perhaps your home town is one of them?

PACIFIC COAST ELECTRICAL ASSOCIATION

477 SUTTER STREET, SAN FRANCISCO 8 • 601 WEST FIFTH STREET, LOS ANGELES 13, CALIFORNIA